ENGINEERING and MINING JOURNAL.

VOL. XXV., No. 19.

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THE SCIENTIFIC PUBLISHING CO., PUBLISHERS,
27 Park Place, New York.

CONTENTS.

EDITORIALS:	PAGE.
The Chattanooga Meeting of the Institute of Mining Engineers	323
Compressed Air for Motive Power in Cities and in Mines	323
Our Course Indorsed	323
New Publications	323
Books Received	324
The Belgian Iron Trade	324
Coal at St. Louis	325
The Steam-Engine of the Future and its Builders	325
The Metallurgy of Nickel	326
South Carolina Phosphate, and the "Acid Grinding Process"	327
The New Metal "Gallium"	328
New Patents	328
Lake Superior Iron Mines	329
Mining News	329
Assay Department	332
COAL NOTES:	
Chinese Utilization of their Coal Deposits	331
The Coal Creek (Colorado) Coal Mines	331
The Monongahela Coal Mines	332
The Anthracite Coal Fields of the West	332
NOTES:	
Mineral Growth	327
Planetary Population	328
Researches on the Theory of Flames	332
Siemens' Hardened Glass	332
Robert Julius von Mayer	332
Solid Sulphuric Acid	332
Platinum-Coated Iron	332
Experiments with Floating Magnets	332
Statistics of Coal Production	333
COAL TRADE REVIEW	333
IRON MARKET REVIEW	335
METALS	335
Salt Lake Ore Market	336
FINANCIAL:	
New York Stocks	336
Miscellaneous Stocks and Quotations	336
Philadelphia Stocks	336
Copper Stocks	336
Gas Stocks	337
Gold and Silver Stocks	337

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THE CHATTANOOGA MEETING OF THE INSTITUTE OF MINING ENGINEERS

Dr. THOMAS M. DROWN, the Secretary of this body, has issued the following circular, bearing date May 1st:

"The Council of the Institute has accepted the courteous invitation of the Iron, Coal and Manufacturers' Association, of Chattanooga, Tennessee, and has decided to hold the annual meeting in that city, beginning Wednesday evening, May 22d, the regular date of the meeting being anticipated in accordance with the authority given by the Institute at the last regular meeting.

"The President of the Association has, with the coöperation of his associates, arranged a most attractive programme of excursions.

"A trip down the Tennessee River is contemplated, amid the magnificent scenery of the rapids, where the river cuts through the Cumberland Mountain, stopping at the Dade Coal Mines, among the largest in the South, thence to South Pittsburg, where the Southern States Coal, Iron and Land Company, Limited, are putting up two 20-foot furnaces, and to the mines of iron and coal in the neighborhood.

"There will also be an excursion to the Roane Iron Works, at Rockwood, passing on the way some fine mines of red fossiliferous iron ore. Another excursion is arranged to pass through the hematite ore districts of Georgia and Alabama, when opportunity will be offered to visit the Woodstock, Stonewall, Tecumseh and Cherokee furnaces. Of historic interest are the battle-fields of Chickamauga, Missionary Ridge, and Lookout Mountain, to which excursions can be made.

"Chattanooga can be reached from Washington *via* the Washington City, Virginia Midland and Great Southern, the Atlantic, Mississippi and Ohio, and the East Tennessee, Virginia and Georgia Railroads; from Louisville, Ky., *via* the Louisville and Great Southern Railway, and from St. Louis *via* the Nashville, Chattanooga and St. Louis Railway.

"The Virginia Midland Railroad offers tickets to members from Washington to Chattanooga and return at $31.35, which may be procured at 601 Pennsylvania avenue, or at the Baltimore and Potomac Depot, Washington, from the 18th to the 21st inst.

"The Nashville, Chattanooga and St. Louis and the Louisville and Great Southern Railroads offer excursion tickets to members to Chattanooga and return at three cents per mile each way, and the Louisville, Cincinnati and Lexington Railway offers tickets to members from Cincinnati to Louisville and return at $5.

"The hotel charges in Chattanooga will not exceed $1.50 per day, and members can be entertained at private houses if they prefer. It is expected that a large number of ladies will attend the meeting and take part in the excursions.

"It is desirable that it should be known in advance how many expect to attend the meeting and by what route they will go. Members are requested therefore to give notice to the Secretary of their intention to attend the meeting.

"Members are also requested to notify the Secretary of their intention to read papers at this meeting."

COMPRESSED AIR FOR MOTIVE POWER IN CITIES AND IN MINES.

The experiments now being made by the Second Avenue Railroad Company with compressed air as a motive power for its street cars revive a suggestion made years ago by us and, judging from the claims of novelty which are made in the city press for the use of compressed air for road traction, there may by and by be a claim made to our old suggestion as a new invention.

The advantages of compressed air over steam in mines are, that it assists rather than injures the ventilation, keeps the air cool, and avoids the injurious effect which steam exerts on timber and on certain kinds of rocks. In the cities, compressed air will not frighten horses as much as the puffing of a steam-engine, but it is not pretended that it will be less expensive. It would avoid the labor of firing and the annoyance of ashes and coal-gas that are the most disagreeable features of the steam cars on our elevated roads.

We confidently expect to see mechanical means take the place of horses for motive power in cities, and it seems probable compressed air may be the most convenient agent, with reservoirs for compressed air located at intervals throughout the city, and engines attached for compressing the air. These might be placed in vaults under the sidewalks, and carriages and wagons could be arranged with reservoirs, which could be charged as often as desired at these street reservoirs, an operation which would occupy but a few minutes; and it would require but a very small reservoir to contain, under the very high pressure assumed, sufficient power to run a carriage three or four miles. The saving in pavements and horse-flesh and in the keep of horses would, in a single year, probably pay the entire outlay required.

OUR COURSE INDORSED.

The following are specimens of indorsements received from prominent gentlemen in Colorado. One says: "Your remarks on Buckeye meet with approbation here." Another says:

"In the last number of your paper I notice 'The Fourth of July Mining Company,' 'Stock Gambling,' as well as other items under 'Gold and Silver Stocks,' in all of which the best possible advice and warning is given to intending investors. I write to, if possible, encourage you, as well as to thank you for this good work. We in Colorado need capital judiciously invested and honestly and skillfully expended. Fraudulent schemes and over-valued properties appear to be the order of the day, and can only end in ruin to the localities where they originate, as well as affecting other places to a greater or less degree. I consider your paper the very best exponent of the mining industry of the United States, and trust you will continue to drive your level on the great fissure, that is, legitimate mining. With best wishes for the success of the JOURNAL as at present conducted."

In addition to the above we have received encouraging words from every side for the course we are pursuing. The mining interests, however, are very extensive, and as Eastern capitalists are, as a rule, invited to invest in undeveloped properties located, in many instances, in comparatively unknown districts, we shall be unable to expose every swindle or overrated property, and are compelled to call upon our readers and those interested in a healthy development of the mining industry to furnish us with unquestioned information relative to such properties as they may learn are seeking capital or proposing to do so.

NEW PUBLICATIONS.

REPORTS OF THE SECOND GEOLOGICAL SURVEY OF PENNSYLVANIA. Harrisburg, 1877.

H. H. H. *Report of Progress in the Cambria and Somerset District of the Bituminous Coal-Fields of Western Pennsylvania. By* F. and W. G. PLATT. Part II. *Somerset.*

I. I. *Oil Well Records and Levels. By* JOHN F. CARLL. *Published in advance of Report of Progress*, I. I. I.

K. K. *Report of Progress in the Fayette and Westmoreland District of the Bituminous Coal-Fields of Western Pennsylvania. By* J. J. STEVENSON. Part I. *Eastern Allegheny County and Fayette and Westmoreland Counties west from Chestnut Ridge.*

We have often had occasion to praise the very judicious and practical plan of publication pursued by the Board of Commissioners of the Pennsylvania Survey. The successive volumes are convenient in form, and while their mechanical execution is not deficient in any particular essential to their use, it is such as to permit the sale of the books at low prices to citizens as well as to scientists. Without the necessity of purchasing a magnificent and bulky "monument of art," the resident of any county of Pennsylvania will be able to obtain for a trifling sum a treatise on his special locality, containing information of great practical value; and the student of geology will find the whole series of these reports more available for reference than if it were compiled into ponderous quartos or folios. In due time, perhaps, the said big books may make their appearance. There is no objection to the elaboration of "final reports" in a style worthy of their permanent and weighty character. The trouble is to know when a report is final. The expensive volumes of the First Pennsylvania survey now prove to be any thing but "final;" and, considering the condition of geology as a science, and the state of the industries related to it, we may be permitted to express our opinion that all reports of this kind may be most appropriately called by the modest appellation, "reports of progress."

The excellent work of FRANKLIN and WILLIAM PLATT, of which report H. H. H. is the result, is very clearly summarized in the interesting preface contributed by Prof. LESLEY himself. Its importance will be recognized when we remind the reader that it involves the discussion of the Pittsburg coal bed, and a general account of the bituminous coal regions of Pennsylvania. This is a subject which we should expect to find treated with special skill and fullness in any survey of which Prof. LESLEY is the head; and in this expectation we are not disappointed. The importance of the topographical relations of coal-formations, so long ago emphasized by Prof. LESLEY, here finds full recognition; and the execution of t h maps, presenting topographical as well as geological features, and the

underground topography, so to speak, as well as that of the surface, is worthy of much praise. Mr. B. SMITH LYMAN, now director of the Geological Survey of Japan, long ago urged this method of constructing maps in a paper before the Institute of Mining Engineers (Trans. Vol. I., p. 183) and gave to Prof. LESLEY the credit of its introduction. The maps of the Japanese survey exhibit the system, and are pronounced by Prof. LESLEY (p. xix of the preface) "models of clearness and fullness." In the volume before us, the map exhibiting the contour of the floor of the Pittsburg bed is a novel and interesting application of the system; and its value as a graphic demonstration is hinted by Prof. LESLEY when he alludes to the natural and almost unconquerable belief of the inhabitants of Somerset County "that the Pittsburg bed passes over the Castleman's River Valley into the hill country to the north, and is the six-foot coal bed at Berlin," a belief which this map refutes in a way plain to the least disciplined minds. It exhibits not only the shape of the bed now found, but also its probable shape in those areas now eroded. Hence, as Prof. LESLEY remarks, it "suggests most important facts for the consideration of mining engineers in the bituminous coal region of Pennsylvania. Among other things, it shows very plainly how flat the center of a coal-basin can be while its walls are steep—a phenomenon exactly the reverse of that which is exhibited along the center lines of some of the crushed anthracite synclinals."

As the result of the more careful observations and discussions of the present survey, Prof. LESLEY calls upon the reader "to expunge from the Final Report of 1858, and from my *Manual of Coal* the name *Elk Lick Coal*, wherever it occurs in its numerous false positions at the bottom of the Barren Measures, and at the top of the Lower Productive Coal Series"—the true place of the Elk Lick coal having been fixed under the Morgantown sandstone and over the crinoidal limestone. This is one of several important difficulties and errors removed by Mr. PLATT'S reëxamination of the bituminous coal measures.

Volume I. I. is a compilation of oil-well records and levels, by Mr. JOHN F. CARLL, published as preliminary to his second report of progress, which will soon appear, as I. I. I. Mr. CARLL'S conclusions concerning the all-important question of the extent of the oil-bearing sand-rocks will be made known in that report. This one gives merely the material on which they will be based. Prof. LESLEY intimates that in some particulars his own views have been overcome by the abundance and strength of the facts which Mr. CARLL adduces in favor of other conclusions. The public will await with curiosity a report thus heralded. Meanwhile, the information contained in this preliminary volume is exceedingly valuable to practical oil operators. It contains the records, more or less accurate, of between 1500 and 2000 well-borings. As Prof. LESLEY remarks, if owners and operators had combined from the beginning to preserve these records, the list would have numbered 20,000 wells, besides being in many cases more trustworthy. But it is matter for congratulation that so much has been rescued from oblivion; and we may draw also from this augury the hope that the mistake of the past will not be repeated.

We will continue the review of these reports in our next. *

BOOKS RECEIVED.

Some of the books in the following list will receive extended review hereafter:

Industrial Chemistry; A Manual for Use in Technical Colleges or Schools, and for Manufacturers, etc. By B. H. Paul, Ph.D. 8vo, pp. 987, illustrated by 698 engravings on wood. Published by John Wiley & Sons, 15 Astor Place, New York. Price $10.

Report of Geological Investigations along the Line of the Cleveland, Canton, Coshocton & Straitsville Railway. By Prof. E. B. Andrews, of the Ohio Geological Survey. Pamphlet, pp. 31.

The Growth of the Steam Engine. By Prof. R. H. Thurston, of the Stevens Institute of Technology. Pamphlet, pp. 94, illustrated. D. Appleton & Co., publishers, New York.

Seventh Annual Report of the Raymond and Ely Mining Company, M. L. McDonald, President. San Francisco, Cal.

Phenomena Connected with Mineral Deposits. By John Milne, Professor of Mining at the Imperial College of Engineering, Tokio, Japan. Pamphlet, pp. 25.

Leitfaden zur Bergbaukunde. Von A. Serlo, Berghauptmann. Third Edition. 8vo, pp. 535, with 640 wood-cuts and 23 plates. Julius Springer, publisher, Berlin, Germany. Reviewed in the ENGINEERING AND MINING JOURNAL, April 6th, 1878, pp. 234.

THE BELGIAN IRON TRADE.

From Advance Proofs of Mr. Julien Deby's Report to the British Iron and Steel Institute.

[*Continued from page* 307.]

The Belgian iron and steel works have lived through the year 1877 on irregular orders and low prices. The general state of trade may be inferred from the fact that such works as Marcinelle and Couillet, the Société Métallurgique, the Compagnie des Conduites d'Eau, the Société de l'Esperance, and some others, paid nothing to their shareholders; while such works as the Fabrique de Fer d'Ougrée, the Société de Regissa, the usines and foundries de Beaume, announced 5 per cent, while a few more, such as Nicaise and Co., reached as high as 6 per cent. The J. Cockerill works, at Seraing, divided £23,200, after having done business during the year to the amount of £1,378,000. The Société des Hauts Fourneaux d'Ougrée distributed £13,300 on an engaged capital of £250,000, and the Société de la Providence 50 francs on the share. No general stoppages or strikes have taken place during the year. The men were regularly employed on low wages, which alone kept many of the mills from closing. The falling off in prices of iron and steel and increasing competition on foreign markets, have forced the Belgian iron masters to realize economies in every department of their works. The result of this action is already being felt outside of the old ordinary sphere of Belgian trade, and even on the British market, where over 50,000 tons of manufactured iron of Belgian make were sold within 12 months.

THE CAUSE OF THE CHEAPNESS OF BELGIAN IRON.

The cheapness of Belgian iron, and especially of the beams and girders, is due to several causes combined, which may be summed up as follows: 1. Cheaper and steadier labor, with twelve-hour shifts. 2. Gas firing, instead of the direct combustion of coal, by which 20 to 25 per cent economy in fuel is realized. 3. Three-high mills for all kinds of iron; saving time, labor, waste ends, and reheating. 4. The native pig employed allows the puddler making four heats more in twenty-four hours than can be done with ordinary Cleveland pig.

A Belgian laborer works from Monday morning at six o'clock until Saturday night at twelve without intermission, and lives on food on which a British laborer would starve. His physical powers are at least one third less than those of the Englishman, by which we mean that, in a Belgian iron-works, the production of a certain tonnage of mill iron will generally be found to employ about one third more labor than would be required in England. A few figures regarding actual cost of labor and iron in Belgium may interest some of our readers:

	Per Metric Ton. Fr.
Cost of pig-iron ready for the furnace at the mill	57·00
Pay of puddlers	9·00
Pay of rollers and hammer-men	3·50
Consumption of coal (800 kilogs.)	12·00
General expenses	10·00
Total	91·50

Or, approximately, 73s. per ton of 1000 kilogs. When the piles are prepared for small beams or angle iron in the usual way, the composition is one third, or 334 kilogs., of muck bar, costing 3·60 fr.; two thirds of old scrap (costing 56·50 fr. per ton, 666 kilogs.), 37·30 fr.; pay of men at piling, 6·70 fr.; pay of heaters, 2 fr.; consumption of coal (750 kilogs.), 11·25 fr.; general expenses, 10 fr. To this must be added the pay of the rollers, straighteners, storekeepers, etc., for metal on market. The waste in well-conducted works is from 20 to 22 per cent, which includes both the loss in the furnace and the waste in the rolling, so that in order to obtain 1000 net kilogs. ready for shipment, 1200 to 1220 kilogs. are required to start with. The steam hammer man receives four francs per day, and the average salaries through the works do not exceed three to three and a half francs. The puddler, who pays his own help, receives about 8s. 3d. per ton of puddled bar.

The Belgian steel works are also working very economically, but yet, for these, competition is much more difficult to sustain. This results from their peculiarly unfavorable geographical relations as regards raw materials. The J. COCKERILL establishment is doing very good work at its new rolling-mills, and the PONSARD furnaces there are also stated to work most satisfactorily.

The exports of manufactured iron reached the sum total of 201,688 metric tons of 1000 kilogs. each, while the imports were only 13,974 tons, leaving a net balance in favor of exports of 187,714 tons. During the same period Belgium imported 193,380 tons of pig-iron, and exported 12,027 tons of the same. The total tonnage of the combined exports of pig and wrought iron amounted to 9453 tons over the year 1876, but less by 8380 tons than during 1875.

EXPORTS OF IRON ORES.

COUNTRIES.	1877.	1876.	1875.
	Tons.	Tons.	Tons.
Prussia	10,682	14,641	3,585
Netherlands	192	4,099	1,212
France	204,338	147,237	136,895
Other countries	446	440	75
Total	215,658	166,417	141,767

PIG AND SCRAP IRON.

COUNTRIES.	1877.	1876.	1875.
	Tons.	Tons.	Tons.
Grand Duchy Luxemburg	50	691	1,380
Hamburg		135	140
Netherlands	1,015	305	500
Great Britain	1,025	799	78
France	7,740	5,464	8,150
Switzerland	1,451	730	688
United States	110	134	266
Brazil	13	105	
Other countries	621	1,113	4,467
Total	12,027	9,480	15,672

IRON WIRE.

COUNTRIES.	1877.	1876.	1875.
	Tons.	Tons.	Tons.
Hamburg		2	5
Netherlands	1,170	913	1,794
Great Britain	100	124	121
France	122	5	241
Portugal	104	69	593
Spain	251	222	92
Other countries	263	703	72
Total	2,012	2,040	2,920

The official statistics of the Siderurgy of Belgium, for 1876, are now in the press. Through the great kindness of the government officials, M. JOCHAMPS, chief inspector of mines, and Mr. WITMEUR, of the same department, we are enabled to furnish a few anticipatory figures regard-

ing this branch of industry. The tabular form is adopted as the more concise and satisfactory :

PROVINCE.	Brabant	Hainaut.	Namur.	Liege.	Luxemburg.	Whole Kingdom.	Observations.	
Number of iron-works	7	161	45	90	11	314		
Number of workmen .	1,156	10,969	1,295	7,927	281	21,626		
Total pig-iron....Tons.	3,644	277,281	42,512	197,458	50,362	571,267		
Value in francs of pig-iron.....	856,000	22,093,503	3,278,575	19,241,019	3,437,200	48,906,297		
Total of wrought iron, Tons.....	17,760	239,208	34,525	124,903	318	416,714		
Value in francs.	3,365,700	42,923,850	5,449,000	25,238,110	130,600	77,107,260		
Total value of pig and of wrought iron.....	4,221,700	65,017,353	8,727,575	44,479,129	3,567,800	125,013,557		
Number of steel works	.....	.....	.....	3	.....	3		
Workmen employed in steel works.....	.....	.....	.....	1,564	.....	1,564		
Product in tons...	.....	.....	.....	75,258	.....	75,258	Ant-werp.	Lim-burg.
Value of product in francs.....	.....	.....	.....	15,641,283	.....	15,641,283		
Native ores iron. Tons	.....	180	175,799	43,910	22,517	269,206	12,100	14,700
Value in francs	.....	1,530	1,858,224	367,180	100,000	2,457,994	60,500	70,560

The above figures show that the whole value of the iron and steel made in Belgium does not exceed £5,626,194 for a product consisting in 571,267 tons of pig-iron, 416,714 metric tons of wrought iron, and 75,258 tons of steel. During the year 1876, the Belgian imports of pig-iron amounted to 193,379 tons, while the exports were only 9480 tons, leaving a balance in favor of imports of 183,899 tons, which, added to the national production of 571,267 tons, gives, for the home consumption of pig-iron in Belgium, an annual total of 755,166 tons. The indigenous consumption of wrought-iron may also be computed in the same manner as follows : Production, 416,714 tons; imports, 28,885; together 445,599 tons; deducting exports 194,782 tons, leaving for domestic uses 250,817 tons of manufactured iron.

COAL AT ST. LOUIS.

Special Correspondence of the Engineering and Mining Journal.

A most encouraging feature and evidence of the growth of St. Louis is the increase of consumption of coal in the city, which exceeded in 1877 that of 1873 by two million bushels, to wit, 35 against 33 millions. Considering the present stagnation in the manufacture of Missouri's pig-iron, the above fact speaks volumes for the permanency of our various manufacturing interests and the rapid increase of population.

The main feeders of this coal trade are the counties of St. Clair and Madison, Illinois. The coal could be laid down at St. Louis at 7½ cents per bushel, leaving proprietors but a small margin, if any. The miners received 1½ cts. a bushel. Since the last three weeks the miners of both counties are on a general strike. The mine-owners say that they are willing to pay two cents when the coöperative mining companies will engage not to undersell them, which they generally do, all previous obligations notwithstanding.

In the mean time, the necessary supply of coal is furnished by more distant mines, largely from Indiana, at the average price of 12½ cents, delivered at St. Louis. One would think that with such a margin of 5 cents—the difference between the cost of Illinois and other coal—a peaceable and mutually advantageous arrangement were possible. To secure it the utmost harmony between the Illinois producers is absolutely necessary. When companies must operate at a dead loss, and miners work at dead low wages or see the bread-giving industry arrive at a dead standstill, while far distant mines get the trade and a considerably higher price than a fair distribution of profits would require for the successful operating of the St. Clair and Madison Mines, a solution of the present difficulty ought to be attainable. B.

THE STEAM-ENGINE OF THE FUTURE, AND ITS BUILDER.

By Prof. R. H. Thurston.*

Having thus rapidly outlined the history of the steam-engine, and of some of its most important applications, we may now take up the question :

What is the problem, stated precisely and in its most general form, that engineers have been attempting here to solve?

After stating the problem, we will examine the record with a view to determine what direction the path of improvement has taken hitherto ; and, so far as we may judge the future by the past, by inference, to ascertain what appears likely to be its course in the present and in the imdiate future. Still further, we will inquire what are the conditions, physical and intellectual, which best aid our progress in perfecting the steam-engine.

This important problem may be stated in its most general form thus : *To construct a machine which shall, in the most perfect manner possible, convert the kinetic energy of heat-motion, as derived from the combustion of fuel, into mechanical power, using steam as the receiver and conveyor of that heat.*

The problem embodies two distinct and equally important inquiries : The first, *What are the scientific principles involved in the problem, as stated?* The second, *How shall we construct a machine that shall most efficiently embody and accord with not only known scientific principles, but also with all well-settled principles of engineering practice?*

The one question is addressed to the man of science ; the other to the engineer. They can only be satisfactorily answered, even so far as our knowledge at present permits, after studying with care the scientific principles involved in the theory of the steam-engine, under the best light that science can afford us, and by a careful study of the various steps of improvement that have already taken place, and of accompanying variations of structure, analyzing the effect of each change and tracing the reasons therefor. The theory of the steam-engine is too important and too extensive a subject to be treated in even the space available for a complete course of college lectures ; and we can only here attempt an exceedingly concise statement of the principles, pointed out by science, as those applicable in the endeavor to increase the economic efficiency of the steam-engine.

The teachings of science indicate that, in the modern steam-engine : *Success in economically deriving mechanical power from the energy of heat-motion will be the greater as we work between more widely-separated limits of temperature, and as we more perfectly provide against losses by dissipation of heat in directions in which it is unavailable for the production of power.*

Scientific research has proved that, in all varieties of heat-engines, a very great loss of effect is unavoidable from the fact that we can not reduce the lower limit of temperature, in working, below a point that is far above the absolute zero of temperature ; the point corresponding to the mean temperature of the surface of the earth in our latitude is now practically our lower mean limit of temperature. The higher the temperature of the steam, however, when it enters the engine, and the lower the temperature at which it leaves the cylinder, and the more thoroughly we provide against waste of heat by conduction and radiation, and of power by friction, the greater will be our success.

Now, looking back over the history of the steam-engine, we may rapidly note the prominent points of improvement and the most striking changes of form ; and we may thus obtain some idea of the general direction in which we are to look for further advance.

Beginning with the machine of De Caus, at which point we may first take up an unbroken thread, it will be remembered that we there found a single vessel performing the functions of all the parts of a modern pumping-engine; it was at once boiler, steam-cylinder, and condenser, as well as both a lifting and a forcing pump.

The Marquis of Worcester and, still earlier, Da Porta divided the engine into two parts, using one part as a steam-boiler, and the other as a separate water-vessel.

Savery duplicated those parts of the earlier engine which acted the several parts of pump, steam cylinder and condenser, and added the use of the jet of water to effect rapid condensation.

Newcomen and Cawley next introduced the modern type of engine, and separated the pump from the steam-engine proper ; in their engine, as in Savery's, we notice the use of surface condensation first, and subsequently that of a jet of water thrown into the midst of the steam to be condensed.

Watt finally effected the crowning improvement of the single cylinder-engine, and completed this movement of differentiation by separating the condenser from the steam-cylinder, thus perfecting the general structure of the engine.

Here this movement ceased, the several important processes of the steam-engine now being conducted each in a separate vessel. The boiler furnished the steam ; the cylinder derived from it mechanical power ; the vapor was finally condensed in a separate vessel ; while the power, which had been obtained from it in the steam-cylinder, was transmitted through still other parts to the pumps, or wherever work was to be done.

Watt also took the initiative in another direction. He continually increased the efficiency of the machine by improving the proportions of its parts and the character of its workmanship ; and thus made it possible to render available many of those improvements in detail which are only useful when the parts can be skillfully made.

Watt and his contemporaries also commenced that movement toward higher pressures of steam, used with greater expansion, which has been the most striking feature noticed in the progress of the steam-engine since his time. Newcomen used steam of barely more than atmospheric pressure, and raised 105,000 pounds of water one foot high, with a pound of coal consumed. Smeaton raised the steam-pressure to eight pounds, and increased the duty to 120,000. Watt started with a duty of double that of Newcomen, and raised it 320,000 foot-pounds per pound of coal, with steam at ten pounds. To-day, Cornish engines of the same general plan as those of Watt, but worked with forty to sixty pounds of steam, and expanding three to six times, do a duty that will probably average, with good ordinary engines, 600,000 foot-pounds per pound of coal.

The increase of steam-pressure and expansion which has been seen since Watt's time has been accompanied by a very great improvement in workmanship, a consequence of rapid increase in the perfection and the wide range of adaptation of machine-tools, of higher skill and intelligence in designing engines and boilers, increased piston-speed, greater care in obtaining dry steam, and in keeping it dry until thrown out of the cylinder—either by superheating, or by steam-jacketing, or by both means combined ; and it has been further accompanied by greater attention to the important matter of providing carefully against losses by conduction and radiation, and by internal wasteful transfer of heat. The use, finally, of the "compound" or double-cylinder engine for the purpose of reducing friction, as well as of saving some of that heat which is usually lost in consequence of internal condensation and reëvaporation due to great expansion, has already been considered when treating of the marine engine.

It is evident that, although there is a limit, which is tolerably well defined, in the scale of temperature below which we can not expect to pass, using the now standard type of engine, a degree gained in approaching this lower limit is more remunerative than a degree gained in the range of available temperature, by increasing the maximum temperature. Hence, the attempt made by the French inventor, Du Trembly, a quarter of a century ago, and by other inventors since, to utilize a larger proportion of heat by approaching more closely the *lower* limit, was in accordance with what are now well-known scientific principles.

The form of engine here referred to is known among engineers as the Binary Vapor-Engine. In it the heat usually carried away by the water delivered from the condenser of the steam-engine is made to evaporate some very volatile liquid, as ether or carbon bisulphide, which, in turn, by the expansion of its vapor, develops additional mechanical power. Mechanical difficulties have hitherto prevented the success of this form of engine ; but it can not be pronounced impossible that coming inventors may make the system commercially valuable,

* *The Growth of the Steam Engine*, By Prof. R. H. Thurston. Published by D. Appleton & Co., New York.

An important consequence of the still unchecked rise of piston-speed in the modern steam-engine is the approach to a limit beyond which the now standard form of "drop cut-off," or "detachable" valve-gear, can not be used. For the piston would, at that limit of speed, reach the end of its stroke before the drop valve could reach its seat, and the point of cut-off and degree of expansion could no longer be determined accurately and invariably by the governor. This limit has probably already been attained in some engines; and the engineer adopting such piston-speeds as 1000 feet per minute or more is driven back to the use of the older types of "positive-motion" valve gearing, and is compelled to devise special forms of governor which shall have sensitiveness, and yet power sufficient to control these less tractable kinds of mechanism, and to invent reliable and durable forms of balanced valves, and to practice every practicable expedient for making the movement of the valve, and its adjustment by the regulator, perfectly easy. Positive motion and ease of adjustment by the governor are, therefore, evidently the requisites of a successful valve-gear for the engine which will probably succeed the standard engine of to-day.

We may now summarize the results of our examination of the growth of the steam-engine thus:

1. The process of improvement has been one, primarily, of "differentiation;" the number of parts has been continually increased, while the work of each part has been simplified, a separate organ being appropriated to each process in the cycle of operations.

2. A kind of secondary process of "differentiation" has, to some extent, followed the completion of the primary one, in which secondary process one operation is conducted partly in one and partly in another part of the machine. This is illustrated by the two cylinders of the compound engine, and by the duplication noticed in the binary vapor-engine.

3. The direction of improvement has been marked by a continual increase of steam-pressure, greater expansion, special provision for obtaining dry steam, higher piston-speed, careful protection against loss of heat by conduction or radiation, and, in marine engines, by surface condensation.

(TO BE CONTINUED.)

THE METALLURGY OF NICKEL.

By M. Badoureau, in Annales des Mines.

[*Continued from page* 309.]

CONCENTRATION OF ARSENICAL ORES AS SPEISS.

Theory of Operation.—Arsenical ores, like sulphureted ores, are treated by a series of calcinations and meltings. Nickel and cobalt have a great affinity for arsenic, and the tendency of the ores to pass into the slag is therefore weak. Speiss, which is very heavy, is easily separable from slag. Generally speaking, operations commence by a calcination in kilns, the theory of which may be shortly stated as follows:

(1.) In the kiln bottom the arsenic takes the form of arsenious acid, owing to the temperature and the excess of oxygen, and the iron and nickel oxidize. These reactions take place on the surface of the fragments of ore. The nickel oxide which has been formed reacts on the intact parts in the interior of the stuff, and there results a double decomposition, which gives an arsenide of nickel penetrating to the interior, and an oxide of iron which comes to the exterior. In all this, the cobalt and copper accompany the nickel.

(2.) The arsenious acid deposited, together with the small proportion of sulphurous acid formed in the course of calcination, are peroxidized on coming into contact with the porous oxide of iron, and the arsenic acid combines with the latter.

(3.) Carbonate of iron and lime, which often form part of the gangue, are converted by the heat and the arsenic and sulphuric acids into arseniate and sulphate of lime, and hypo-arseniate of peroxide of iron.

(4.) At the upper part of the heap, where there is no longer any excess of oxygen, the ore loses its excess of arsenic, and the latter usually distills as a sulphide of arsenic.

When the operation is over, arsenious acid and sulphide of arsenic are collected on the surface of the heap. The roasted lumps have a core of arsenide rich in nickel, cobalt, copper, and a crust compounded mainly of sulphate and arseniate of iron and lime. Silicated gangues are not subject to chemical reaction, but the roasting makes them friable. The roasted ore is afterward melted, this operation being a reductive fusion analogous to that undergone by copper ores calcined on the Continental plan. At the upper part of the furnace, the arseniates and sulphates are reduced by the oxide of carbon, and give off arsenious and sulphurous acid. At foot these same matters are reduced by the fuel.

All the stuff comes down reduced into the crucible, where the blast tends to oxidize it. A reaction, however, takes place between the nickel, copper and cobalt oxides on one hand, and the sulphides and arsenides on the other, and this reaction gives rise to sulphides and arsenides of nickel, cobalt and copper, and to oxide of iron, which goes into the slag. Remaining in the crucible also makes the slag richer in iron, and the speiss richer in nickel, cobalt and copper. The slag ought to be fluid, and have the composition of a monosilicate rather than that of a bisilicate, in order to carry away but little cobalt and nickel. Sulphur should, as far as possible, be removed from the batch, except where it is wanted for carrying off the copper.

As to the reactions to which arsenical ores of nickel and cobalt are subject in the furnace, we may enunciate the three laws following, analogous to those we have already given with reference to sulphureted ores:

(1.) When nickel arsenide is melted with a fluid slag containing 33 per cent. of protoxide of iron, scarcely any nickel at all passes into the slag; the same experiment being made with cobalt arsenide, the cobalt also resists exceedingly well.

(2.) When nickel oxide is melted with arsenic or mispickel, the nickel passes almost entirely into the speiss; the same experiment being tried with cobalt oxide, the cobalt passes only in part into the speiss.

(3.) When silicate of nickel is melted with arsenic or mispickel, the nickel passes partly into the speiss; the same experiment being tried with cobalt silicate, the reaction is still less perfect.

From this we may draw the lesson that silicatization of nickel and cobalt oxides should, as far as possible, be avoided, and consequently the ores should be melted before being reduced.

The first speiss is enriched by means of calcinations and meltings. The stable condition of the arsenides corresponds to the formula M_4As; the arsenide of nickel, Ni_4As, is to nickel as sulphide of copper, Cu_2S, is to copper. The different metals forming speiss have chemical equivalents which closely correspond to each other, and the formula M_4As answers in nearly all cases to a proportion of 38 per cent. of arsenic.

Calcining on a small scale an arsenide with the formula M_4As, we get, according to Plattner, an arseniate with the formula $9MO,AsO_5$, and, consequently, a proportion of 25 per cent. of arsenic acid. In actual work calcination is never carried out so completely. On melting roasted speiss, the arsenide of iron reacts on the oxides and arseniates of the other metals and oxide of iron is formed, which is carried off by suitable fluxes—quartz, potash, carbonate of soda or white glass. The speiss retains the formula M_4As, but the nature of the metals designated by M is subject to change. The nickel remains as an arsenide, and the cobalt is usually divided between the speiss and the slag. The latest meltings are almost always carried out in reverberatory furnaces, and frequently in blast reverberatory furnaces, known as Hungarian furnaces. The number of operations which the stuff undergoes depends on its own richness, and the degree of richness which is wished for the speiss. It is difficult to go beyond 62 per cent. in nickel and cobalt. To get this result we have to scorify the whole of the iron, and we can not therefore avoid scorifying a part of the nickel, and particularly of the cobalt, at the same time. I am, therefore, of opinion that the concentration should be stopped at a rather earlier stage of the proceedings.

EXAMPLES FROM THE SCHLADMING WORKS, 1867.

The Schladming Works used to treat 30 tons of ore a year. The ore contained 11 per cent nickel and 1 per cent cobalt.

I. *Roasting.*—The ore was roasted in an open kiln 5 meters deep, 4 meters broad, and 1·2 meters high (Fig. 1). The hearth was built in masonry channeled out for circulating the air. Besides these were provided two square wooden pipes placed vertically over the two points, *A* and *B*,

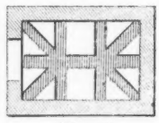

FIG. 1.

where the channels in the hearth were made to meet. Even after carbonization, these wooden pipes made an efficient chimney. The kiln was charged with 3 stères of wood, 1½ hectoliters of small charcoal, and 18 to 20 tons of ore in fragments of from 2 to 3 centimeters in diameter. The whole was then covered in with smalls, the front of the kiln was shut in with a dry stone wall, and lighted braise was sent down the wooden pipes. Roasting went on for five or eight days, the mass being occasionally pierced with an iron clinker bar. In spite of the fixation of oxygen, the ore lost 10 to 12 per cent of its weight in the roasting, part of the arsenic being carried off, together with sulphur and carbonic acid. At the end of the operation the arsenious acid and arsenic sulphide on the exterior of the heap were collected and sold.

II. *Melting.*—The calcined ore was melted with 22 per cent of quartz in a furnace which is still in existence at Hopfriesen, where I took a drawing of it (Figs. 2 and 3). It has a trapezoid section; the distance

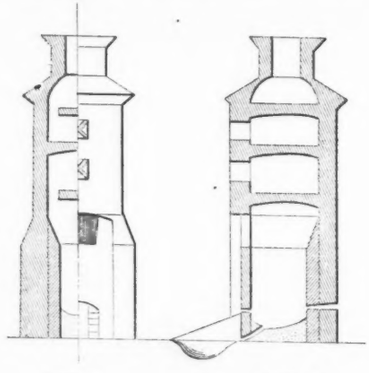

FIG. 2. FIG. 3.

between the tuyere face and the front face is 63 centimeters, the breadth of the tuyere face is 48 centimeters, and the breadth of the front face 55 centimeters. The height from tuyere to throat is 1·70 meters. In the interior of the furnace is a crucible 25 centimeters deep, holding 140 kilograms of speiss. The furnace breast is closed. The slag ran off constantly at a tap-hole at the upper part of the inner crucible. So long as the slag remained fluid, the proportion of quartz in the fettling was increased so as to scorify the largest possible proportion of iron. The slag was picked; fragments containing grains of speiss went back to the furnace; the others were granulated, pounded and mixed with milk of lime, forming a sort of brasque, out of which speiss pots were made. Of these there were two, each corresponding to a tap-hole communicating with the lower part of the inner holder. The speiss was allowed to cool in the pot, where it solidified in cakes 4 to 5 centimeters thick, which were lifted out with a fork. The speiss had a beautiful iridescent appearance, and a crystalline structure like that of snow. The ash carried up by the current of gases was deposited in condensation chambers placed above the furnace.

The blowing machine was driven by a water-wheel, which delivered

the relatively large quantity of 30 cubic meters of air per minute. The furnace was attended by three couples of workmen, who worked straight on for twenty days in eight-hour shifts.

For every two parts of raw ore there were obtained 89 of calcined ore. The furnace was charged thus:

Roasted ore	89·0
Quartz "	19·5
	108·5

and it yielded:

Speiss	26
Slag, about	80

The composition of the speiss was as follows:

Ni	45—47
Co	4—6
Fe	8—10
Cu	1—1·5
As	33—36
S	1—2
Carbon, slag, etc	1—2
	100

Five tons of roasted ore were passed daily through the furnace; with 900 kilograms of charcoal, 1400 kilograms of speiss were got. The speiss was run off from ten to twelve times a day, or nearly every two hours. Treating 30 tons of ore a year, there were made 8 tons of speiss, which were sent to Mandling.

EXAMPLES FROM SCHLADMING, 1860.

In 1860, when Mr. Fuchs paid a visit to Schladming, the enrichment of the speiss was carried farther than in 1867.

I. *Roasting.*—This was carried on in the manner described in the preceding section.

II. *Melting for First Speiss.*—The calcined ore was melted in the furnace described above, with this difference, that it had a crucible in front instead of having the breast closed. This arrangement was not so good for the useful reactions which have already been detailed. The outside melting pots were made with a mixture of clay, pounded brick and coke. Not more than 3·5 tons were passed a day. According to Mr. Fuchs the fettling consisted of:

Roasted ore	100·0
Slag-nose, rich slag, dust	3·0
Quartz	0·6
	103·6

The yield was 17·8 parts speiss to 100 of ore. The speiss had the composition following:

Ni, Co, Cu	56
Fe	6—7
As	37
	100

The speiss was sent to Mandling where concentration was continued in the following manner:

III.—*Calcination of Speiss.*—First of all the speiss used to be calcined on the hearth of a reyerberatory furnace. The hearth had the shape of an eight-pointed star, each ray of which was furnished with a door. The fuel, which was wood, was contained in a rectangular fireplace, measuring $2^m{\cdot}50$ by $0^m{\cdot}50$, placed below the hearth. The gases escaped at a small chimney at the center of the hearth. The circular opening through which they made their exit was surrounded by a small flue-ring, and the gases collected from the body of the furnace were condensed in an upper condensing chamber. The hearth was inscribed in a circle having a radius of $1^m{\cdot}40$; the height from earth to roof was $0^m{\cdot}40$. When cold, the furnace took five or six hours to heat; it was then charged with 200 kilograms of speiss. The operation lasted twelve hours; the fuel was wood, of which 4 stères were consumed. The roasted product contained 30 per cent of arsenic acid.

IV. *Melting for Second Speiss.*—The calcined speiss was melted in crucibles heated in a wind furnace. The batch was composed as follows:

Roasted speiss	100
Potass	30
Arsenious acid	12
Quartz	12
	154

The arsenious acid was bought at Salzburg. There is no need to point out that there is something radically wrong in a method which buys arsenious acid in treating arsenical ores. The crucibles were graphite from Passau, costing 6 fr. 65 each. At three o'clock in the morning the furnace was charged with eight crucibles, each containing 16 to 20 kilograms of calcined speiss. The heating went on by degrees; at six o'clock the furnace was hot; at twelve o'clock the work was complete, and the fire was left to slacken. At five o'clock next morning the furnace was emptied and recharged with fresh crucibles, the furnace being still warm. Charcoal was burnt, the daily consumption being 55 hectoliters. For every 100 parts of roasted speiss were obtained 85 of rich speiss, having the following composition:

Ni, Co, Cu	67
Fe	2
As	31
	100

—*Iron.*

(TO BE CONTINUED.)

MINERAL GROWTH.—Mr. T. A. READWIN in *Chemical News* says: "Since my last communication several of my recent *electrum growths* have remarkably changed. But what I wish now to announce is, that I have observed an unmistakable tendency in some of the varied infantile shapes to assume definite isometric forms. In fact, three of them have crystallized cubically since the beginning of the present year. I may also mention that two cube electrum crystals have recently grown out of two hard specimens of Marioneth quartz, the surfaces of the quartz itself being (apparently) free of metallic sulphides, etc. I am inclined to think that recent inorganic growths of this kind may be very common, but I am not aware of such having been before observed and publicly recorded."

SOUTH CAROLINA PHOSPHATE, AND THE "ACID GRINDING PROCESS."

By Henry Pemberton, Jr., in "Polytechnic Review."

The city of Charleston is situated at the confluence of the Ashley and Cooper rivers, which, after running a parallel course for nearly six miles, unite here and form a spacious harbor.

Upon the shore of the Ashley river, some ten miles from Charleston, the discovery was first made of the true character of the Phosphate Rock, which now constitutes the basis of almost all fertilizers manufactured in the United States. The locality has been long known as a rich field in fossils, occuring in the post-pliocene age.* On account of the abundant remains of marine animals found there, it is known in the geology of the State as the "Fish Bed of the Charleston Basin."

These fossils (shells, teeth, vertebræ, etc.) occur distributed through a layer of blue clay and sand, containing an immense number of "nodules" or "conglomerates," of worn and irregular shape. Up to 1867, these nodules were considered to be fragments of marl, which had "lost all its lime or calcareous particles, and had become silicified." They had, therefore, escaped any particular notice or examination. The credit of this discovery of their true nature is due to Professor F. S. HOLMES, and more particularly to Dr. N. A. PRATT, the latter having first proved, by analysis, that they were really bone phosphates, containing an average of 55–65 per cent. phosphate of lime.

As before mentioned, they occur immediately below the surface of the ground, at a depth running from a few inches to twelve feet or more; the layer extending over many miles of country, and forming frequently the beds of rivers. As Dr. PRATT remarks, "It seems that there are no rocks in this section that are not phosphates." In 1877, in one instance, over 16,000 tons were mined and sold from a measured 11 acres. The layer has a thickness varying from 4 to 18 inches.

The appearance of the phosphate rock is that of irregular, water-worn, perforated nodules, full of the impressions of shells, and of other fossils, principally of a yellow or earthy color, occasionally grayish-black, varying in size from large grains to pieces of several pounds' weight, but in general between the size of a walnut and a man's fist. They are easily crushed and ground, and easily soluble in acid. Heated out of contact with the air, they burn to an iron-black color, from a small quantity of organic matter present.

They have not the slightest resemblance to bones of any kind. The popular, though mistaken, idea seems to be that they are the *direct* remains of the skeletons of animals modified by friction, etc., in water. A newspaper article on the subject gives a picturesque description of the locality as being a former salt lick, to which all the animals of the country resorted "dragging themselves here to die."

Doubtless, something of the kind was the case regarding some of the true animal fossils (teeth, vertebræ, etc.), a few pounds of which occur to every ton of phosphate nodules. But the latter have no resemblance whatever to any kind of animal remains. They are not bones, nor have they a particle of any organized structure. They are amorphous, irregularly shaped masses containing an immense number of impressions of shells, and of the borings or tracks of various small animals.

So universally is this the case, that not a single nodule can be found that does not contain these fossils or borings. As a result of this fact, it is necessary that the phosphates must either have existed as a soft mud, or have been precipitated as such—thus inclosing the fossils now found in them, or else that these fossils have existed previously in some other inclosing material or deposit, which has subsequently been gradually replaced by phosphate of lime. The source of the phosphate of lime was probably of animal origin, although there is no positive proof of this—no entirely satisfactory geological explanation has ever been given regarding these deposits.

The preparation of the phosphate rock for the market is extremely simple, consisting merely of a hydraulic washing to remove sand and clay—much of the rock from river beds not even requiring this. In either case, it will be observed that the rock goes into the market always *saturated with moisture.*

THE FOLLOWING ARE ANALYSES.

	1. Williams & Moss.	2. Voelcker.	3. Evans & Jones.	4. Voelcker.	5. ?
Moisture @ 212° F.	7.73	4·85	1·94	—4·48	1·84
Organic matter			4·86		
Phosphoric acid		26·08		27·56	28·34
Phosphate of lime	61·37	=56·93	55·65	=60·16	=61·86
Sand, etc	12·03	10·28	17·00	10·77	13.13
Lime		40·67		41·50	39·64
Carb. lime	8·20		6·10	Carb. Acid.	2·15 (2)
Iron and alumina	7·04 (1)				14·86 (3)
Sulphate of lime	2·68	18·12	14·45	15·69	
Chloride of sodium	0·62				
Fluoride of calcium	Trace.				
	99·65	100.00	100·00	100 00	100·00

(1) This is *phosphate* iron and alumina.
(2) =4·90 per cent. carb. lime.
(3) This probably includes all undetermined matter and loss.

I have one remark to make regarding these analyses; they are all made on air-dried samples. The mean of the three determinations of

Water alone	2·89 per cent.
Mean of water and organic matter	6·34 "

As delivered by entire cargoes, the per cent of moisture is higher. The writer found moisture present in the rock five months after it had been delivered at the works, and stored in a pile under cover, equal to

(1)	9·5 per cent.
(2)	10·0 "

Or nearly ten per cent moisture, driven off at a moderate heat.

Again, three average samples were selected, and calcined in covered iron vessels, at a *dull* red heat, with loss equal to

(1)	14·6 per cent.
(2)	16·6 "
(3)	13·8 "
Mean	15·0 "

*The uppermost division of the most recent of geological formations, being immediately beneath the alluvium or soil. The marine fossils represent species fully ninety per cent of which continue to the present time.

This loss was free and combined water, organic matter, but little or no carbonic acid. (Since the samples, when cold, dissolved with brisk effervescence in hydrochloric acid.) The above samples were taken from a pile of several hundred tons. It may be considered as established, therefore, that the moisture present in the rock as delivered is about 10 per cent., and the total water + organic matter, in the neighborhood of 15 per cent. The amount of phosphate of lime present is, therefore, reduced from 59·20 per cent., the mean of the above analysis, to 54—55 per cent. Another result from this presence of moisture, we shall see further on.

The amount of rock mined and sold yearly is very large. During the year ending August 31, 1877, the total shipments from Charleston and vicinity amounted to over 184,000 tons. Of this, 115,000 tons were sent abroad to England, Scotland, Holland, Denmark, and elsewhere, the rest being shipped to coastwise ports. When it is remembered that one ton of rock makes about a ton and three-quarters of superphosphate, and that the latter is applied at the rate of 200—300 pounds per acre, it will be seen what an immense quantity of land is dependent for its fertility upon these "dissolved bones"—more particularly so, when we remember that this of South Carolina is but one of many deposits of equal importance and value in various parts of the world.

Until the phosphate of lime is rendered soluble by treating with acid, it is of no value to the soil. In the usual method of manufacture, the rock, in all cases, has to be dried before grinding on account of the amount of moisture present, as indicated above. It is impossible to grind a damp substance to a uniformly fine powder, and when the rock is coarse, the decomposition by the acid is slow and incomplete, and the quality of the superphosphate correspondingly low. This drying is performed, sometimes by kilns, sometimes by heating in revolving cylinders, or by other methods.

It is then ground in buhr-stones, a fair average amount being six to seven tons in twelve hours per mill, differing, of course, with the size of the stone power of the engine, etc. It is next treated with sulphuric acid, "chamber" acid, of 47°–50° Beaumé. This is done in mixing machines of various patterns, with revolving arms or stirrers. From these the semi-fluid mixture of acid and rock runs into the "dens," where it is allowed to react and harden. After running 12 to 24 hours in these it is taken out, screened, and packed ready for the market.

THE "ACID GRINDING PROCESS."

A much simpler method, and one possessing many advantages over the above, was patented a few years since, jointly by Mr. GEO. T. LEWIS, of Philadelphia, and Dr. N. A. PRATT, of the same city, both of whom have been much interested in the phosphate industry, and were the first and most prominent in developing it in this country.

In this process the rock is not dried, but is ground in the mills, with the natural moisture in it, as delivered. The rock is, as usual, first crushed to the size of peas, in a crusher, and then ground *with the acid in the buhr-stone*, so that both the grinding and mixing are done in one operation; in fact, the entire manufacture of the superphosphate is but one operation.

It enters the buhr and is discharged at the rate of about one pound per three seconds, being in this time finely ground and brought into most thorough and uniform contact with the acid. The temperature rises to the boiling point, partly from friction, partly from the chemical action; large quantities of steam, together with carbonic acid, hydrofluoric acid, and fluoride of silicon, ascend through the ventilating pipe, while the hot mixture of acid and dissolving rock runs out into the den below; a small quantity of this caught on a flat paddle, and smoothed out, looks like so much yellow cream, which, in an hour or so, hardens to a crumbling mass of rich superphosphate. With stones running at the rate of about 280 revolutions per minute, the amount of rock ground (average of work done by 42-inch and 48-inch stones in eight months) is 1253 lbs. per hour per each mill; thus making about 2100 lbs. superphosphate, more or less, according to strength of acid, and per cent moisture in rock. Nitrogenous material and sulphate of ammonia or potash can be ground in with the rock. Muriates, also, to a limited extent, but not in too great quantity, since the resulting chloride of calcium, being hygroscopic, renders the superphosphate always damp.

The method embraces the principal desiderata of a mechanical process; it is simple, quick, few expenses, and gives the desired result in the best possible manner. It is applicable in any case in which it is desired either to: (1) grind and acidify, as, for example, manufacture of "aluminous cake," treating of certain clays for alum, preparing acid phosphate of lime from bone, ashes, etc., etc., or (2) to grind and extract with water or other solvent, not necessarily an acid. It is in full operation at the works of the United States Fertilizing and Chemical Co., Cooper's Creek, Camden, N. J., turning out the highest grade superphosphate to be found in the market, and has been running satisfactorily ever since put in operation.

On general principles it is probable that this acid grinding process will play an important part in the superphosphate industry of this country.

It is rather a dangerous plan to attempt to prophesy the future of any thing in this world; but just exactly as the railroad that has the shortest and quickest connections will be the one most profitable in the long run, so will the most simple and direct process of any manufacture in the struggle of competition prove once more the old theory of the "Survival of the Fittest."

(TO BE CONTINUED.)

THE NEW METAL "GALLIUM."

THE LATEST KNOWN OF THE METALLIC ELEMENTS—ITS GENERAL APPEARANCE LIKE LEAD—THE HISTORY OF ITS DISCOVERY.

Prof. ODLING delivered a lecture recently at the Royal Institution, London on the new metal, "gallium." The professor said that the number of kinds of matter known to chemists which they have not succeeded in decomposing, but can trace undecomposed through distinct series of combinations, is 64. These have been roughly classified into metals, semi-metals and non-metals, the first class being considerably the most numerous, and the several classes merging gradually into one another. The latest known of the non-metallic elements is bromine, which was discovered in 1826 by the eminent French chemist, recently deceased, M. BALARD. Within the last 20 years, however, five new metallic elements have been discovered, being at the average rate of a new element every four years; while some evidence of the identification also of yet a sixth new metallic element has recently been put on record. But the latest known of the fully made out new elements is gallium, which was first recognized by M. LECOQ DE BOISBAUDRAN in the autumn of the year 1875, and so named by him in honor of the land of its discovery, France. Like its four predecessors made known within the last 20 years, gallium was discovered by the process of spectrum analysis, applied in this instance in a special manner contrived by the ingenuity of M. DE BOISBAUDRAN himself, long eminent as a spectroscopist. The spectrum of gallium is characterized by two marked violet lines, the less refrangible of them being especially brilliant. Hitherto the new metal has been recognized only in certain varieties of zinc-blende, that of Pierrefitte in the Pyrenees having furnished the chief portion of gallium hitherto obtained from any source whatever—nearly half a ton of this ore having been employed by M. DE BOISBAUDRAN to furnish the dozen grains or so of metal wherewith he has been able to establish the leading properties of the element. In its appearance gallium manifests a general resemblance to lead, but is not so blue-tinted or quite so soft, though it is readily malleable, flexible and capable of being cut with a knife. Like lead again, and unlike zinc, gallium is not an easily volatile metal. Unlike lead, however, it acquires only a very slight tarnish on exposure to moist air, and undergoes scarcely any calcination at a red heat. The specific gravity of gallium is a little under 6, that of aluminum being 2·6, that of zinc being 7·1, and that of lead 11·4. A most remarkable property of gallium is its low melting point. It liquefies completely at 86° Fahrenheit, or below the heat of the hand; and, still more curiously, when once melted at this temperature, it may be cooled down even to the freezing-point of water without solidifying, and may be kept unchanged in the liquid state for months. Indeed, in the original communication of its discovery to the French Academy, it was described as a new liquid metal, similar to mercury; but on touching with a fragment of solid gallium a portion of the liquid metal in this state of so-called sur-fusion it at once solidifies. Unlike lead, again, gallium is a highly crystalline metal, its form being that of a square octahedron. In its chemical habitudes the rare element gallium shows the greatest analogy to the abundant element aluminum. In particular it forms a sort of alum not to be distinguished in its appearance from ordinary alum, but containing oxide of gallium instead of oxide of aluminum or alumina.

But the chief interest of gallium, from a scientific point of view, is connected with the history of its discovery. All previously known elements have been discovered, so to speak, accidentally, and their properties have been not in any way foreseen, but rather met with as subjects of surprise; but the blende of Pierrefitte was deliberately taken up for examination by M. LECOQ DE BOISBAUDRAN in the expectation of finding a new element—an expectation to which he was led, in the course of his study of the spectra of known elements, by a train of speculation of which he has not yet made known the details. The existence of an element having the characteristic properties of gallium was, moreover, upon entirely different grounds, predicted very definitely by a Russian chemist, M. MENDELEJEFF, in 1871, and in a more general way several years earlier by an English chemist, Mr. NEWLANDS. This double prediction was based on a study of the relations of the known atomic numbers of the elements. These numbers have only lately been perceived to form a tolerably continuous seriation, which, again, is associated in a remarkable manner with the seriation in properties of the elements themselves. In the series of numbers, however, certain terms are here and there missing, and in particular a number was missing which should belong to an element having properties intermediate between those of aluminum and iridium. What these properties would be was predicted in most minute detail by M. MENDELEJEFF in 1871. He predicted, for example, that the specific gravity of the missing metal would prove to be about 5·9. Operating on very small quantities, M. DE BOISBAUDRAN, in the first instance, found the specific gravity of gallium to be 4·7; but on repeating his determination in 1876, with special precautions and on a somewhat larger though still very small scale, he found it to be exactly 5·935—certainly a most remarkable fulfillment of the prediction with regard to it.

NEW PATENTS.

The following is a list of the new inventions relating to Iron, Coal, Mining Machinery, Chemical Apparatus and the treating of Precious Metals, etc., from the official *U. S. Patent Gazette*, for week ending April 2:

No. of Patent.	*Title of Invention.*	*Name of Inventor.*	*Residence.*
201,874	Air and Steam Engines	Hezekiah E. Depp	Sedalia, Mo.
201,909	Pumps	Wm. Burlington	Baltimore, Md.
201,968	Dynamo-Electric Machines	Edward Weston *	Newark, N. J.
201,980	Hydraulic Elevators	Cyrus W. Baldwin	Brooklyn, N. Y.
201,968	Fire-Tube Boilers	Theo. Boehmler & Co.	Cedar Falls, Ia.
201,997	Portable Derricks	Watts Cooke	Paterson, N. J.
201,998	" " "	" " "	"
202,034	Anti-Friction Bearings for Journals and Axles	Thomas H. King	San Francisco, Cal.
202,030	Process for Mfg. Illuminating Gas	Alonzo C. Rand	Minneapolis, Minn.
202,060	Rock Drills	Henry C. Sergeant	New York, N. Y.
202,038	Machines for Purifying and Compressing Air	Richard Wilsdon	Toledo, O.

* Assignor to Weston Dynamo-Electric Machine Co., Newark, N. J.

PLANETARY POPULATION.—On the interesting question of the plurality of worlds, Professor Newcomb remarks as follows: "Enthusiastic writers not only sometimes people the planets with inhabitants, but calculate the possible population by the number of square miles of surface, and throw in a liberal supply of astronomers, who scan our earth with powerful telescopes. The possibility of this it would be presumption to deny; but that it is extremely improbable, at least in the case of any one planet, may be seen by reflecting on the brevity of civilization on our globe when compared with the existence of the globe itself as a planet. The latter has probably been revolving in its orbit 10,000,000 years; man has probably existed on it less than 10,000 years; civilization less than 4,000; telescopes little more than 200. Had an angel visited it at intervals of 10,000 years to seek for thinking beings, he would have been disappointed a thousand times or more. Reasoning from analogy, we are led to believe that the same disappointments might await him who should now travel from planet to planet, and from system to system, on a similar search, until he had examined many thousand planets."

LAKE SUPERIOR IRON MINES.

We take from recent issues of the *Marquette Mining Journal* and the *Ishpeming Iron Home* the following concerning the present condition of some of the principal active mines of the Lake Superior iron region:

The New York Mine.—This company has at present about 26,000 tons of ore stocked, and are adding rapidly to this amount. The old shaft in the west end of the Beardsly pit is being timbered up so as to get at the ore at the bottom, on which it abuts, and is a continuation of the vein struck by the diamond drill some time since. This deposit is turning out more valuable than was at first anticipated. A large force has been at work during the last few weeks stripping and sinking test pits, to determine the character and extent of the deposit, and work has progressed far enough to give a very definite idea of the position of the vein. It runs east and west over a distance of 390 feet, with an average width of about 50 feet. At the main opening the ore was covered by nine feet of sand drift, and dips toward the south. Some of this ore has been analyzed, and found to contain 68 per cent of metallic iron, with scarcely a trace of phosphorus. This company is organized under the general mining laws of Michigan, with a capital stock of half a million dollars, divided into 20,000 shares.

The Republic Mine.—This mine is being worked at present by a force of 300 men, and is all let on contract. They average about 600 tons daily. Their facilities for shipping are such that they can load and ship something in the neighborhood of 300 cars daily. It is anticipated that the output of this mine will be about the same as last year, unless the bottom drops entirely out of the ore market.

The Champion Mine.—This company has just received a new diamond drill, which it will put in operation immediately. The mine is in a splendid condition, and the company is making active preparations for the shipment of ore.

The Barnum Mine.—The diamond drill, working at the west end of the Barnum mine, has been taken from that place and put to work in the bottom of the old main shaft, where explorations will be made in various directions. The company is now hoisting from the new skip-way about 40 skips per day.

The Cleveland Mine.—At this mine about 45,000 tons of ore have been stocked, none of which will probably be shipped until the 1st of May. The contracts in Nos. 2 and 3 pits, and in the incline mines, run out on the last of April. At shaft B the diamond drill is now proceeding downward rapidly, having succeeded in checking the sand from entering the hole. The drill is now in a hard quartzite. This company is shipping about 30 cars of ore per month to the Depere furnace.

The Keystone Mine.—The shaft on this mine is about fifty feet deep, opening up a splendid stope of ore. Their forces are to be increased, and it is thought that more ore will be mined the coming summer than has been gotten out in any one season since it opened.

The Humboldt Mine.—This company is putting in the necessary machinery and will commence work at the original opening of the old Washington mine, near the Edwards, where a large body of ore is known to exist. The mine is looking extremely well throughout, and, with a favorable market, will be able to more than double its last year's product.

The Quinnesec Mine.—The Menominee *Herald* says: "Some sixty men are at work on this mine. What ore is taken out is being shipped to Escanaba. No difficulty will be experienced in shipping 50,000 tons from the mine, should the market demand it, and there seems to be a probability that the starting up of the Milwaukee iron works, and possibly some other Western enterprise, will create a 'home demand' for this amount of ore." This company is shipping forty-five carloads of ore per day.

The Edwards Mine is working a force of about fifty men, and raising about 1000 tons of ore per month. These figures can, however, be more than trebled should the outlook warrant a corresponding increase of the force.

Salisbury Mine.—At this mine the shaft is down, and the drift running south to the skip shaft is now in about 70 feet, and is going through hard rock. The mine is looking well, and will be in condition to mine and ship forty or fifty thousand tons of ore this season, should the exigencies of the time require that amount.

The Superior Mine.—Sinking has ceased on this mine, and the company is now drifting to ascertain the extent of the vein.

Goodrich Mine.—At this mine operations have again been resumed. A sale of 5000 tons of ore has already been made, and it is expected that a like amount, or more, will be contracted for before the present contract is filled. A force of thirty-five men have already been put at work, and ore will soon be shipped from the mine. There are at present only about 300 tons in the stock pile.

The Charlotte Furnace Company.—The Greenup (Ky.) *Independent* says: "This company, to whom the Iron Hills furnace and lands were rented for two more years, have made during the last three years of their operation 7300 tons of iron. Their last year's blast commenced on the 24th of May and lasted 213 working days, during which time 2320 tons were made—a daily average of over 11 tons. The cost of the material smelted in producing one ton of iron is stated to us as follows:

197 bushels charcoal at 4c	$7.88
3½ tons of iron ore, $1.40	4.90
Two fifths ton limestone at 50c	20
Total	$12.98."

The Hunnewell Furnace.—The operations of this furnace during the past year are condensed in the following statement: Blowing 302 days, the furnace made 5265 tons of iron, a daily average of 17·43 tons, using 14,312 tons of ore and 694,843 bushels of charcoal. This represents an average consume of material to the ton of pig iron made of 132 bushels of charcoal, and 2·72 of iron ore, a very satisfactory result.

The Hocking Valley (O.) Region.—The average cost of pig-iron making in the Hocking Valley iron region is claimed to be from $14 to $15 per ton, but it is thought that an average of from $15 to $18 per ton is nearer the correct figure. For ore they pay from $1.75 to $2.25; for coal, 90 cents to $1.40; and for limestone, 70 to 80 cents per ton at the furnace. The general average of material used to the ton of iron made is stated at from 3 to 4 tons of ore, 2½ to 4 tons of coal and ¾ to 1 ton of limestone. Of the thirteen furnaces located in this region, nine are now in blast, two will soon be blown in and two are still in process of construction. Their height ranges from 41 to 52 feet, and their bosh diameter from 11½ to 16 feet.

The five large rolling mills in Cincinnati are all in operation with orders more plentiful than at this time last year.

The Bellefont (Ky.) furnace blew out on the 11th of February, finishing a blast of 268 days, which she commenced on the 4th of May, 1877. During this time she made 3066 tons of good, mostly No. 1, charcoal iron, or a daily average of 11·44 tons. This product was the result of smelting

154 bushels of charcoal at 4½c	$6.93
3 tons of iron ore at $2.50	7.50
A total cost of material of	$14.43

per ton of iron made.

The average consume of cord-wood per ton of iron represented by the above 154 bushels of charcoal was 3·63 cords. At present this furnace has on hand and unsold 4500 tons of pig-iron, and Mr. Charles Meade, her manager, is having cut some 11,000 cords of wood, preparing a blast for this season equal to the last.

Freights.—The Cleveland *Review* says that several season charters have been made for the transportation of iron ore from Marquette, the ruling rate being $1.40 per ton. There was one charter from Escanaba at $1.20 per ton.

The S. C. Smith mine will be worked during the coming summer, unless something unforeseen transpires to change the present intention of the owners.... Clinton Peck, at the Magnetic mine, is working a few men in the old shaft, and has a fine showing for ore....At the Pendill mine they have removed the old engine-house, and are making preparations for a new and larger one, to enable them to handle the ore with greater speed, as the machinery they had in was not large enough to do the work required. It is generally believed that the Jackson vein has been struck....The owners of the Emmet mine property expect to be able to make regular shipments from their new red hematite discovery after the first of May. No tests of the ore have yet been made, but it looks very favorable, and has been so pronounced by experts. The ore can be mined very cheaply.... A large and rich vein of hematite ore has been opened at Andover, Sussex County, N. J....The Belfont Iron Works, of Ironton, O., have purchased 1000 acres of the Lawrence furnace lands at $30 per acre....The St. Louis Bolt and Iron Company are using in their works iron brought from near Atlanta, Ga., which they can lay down at their works in East St. Louis for $13.75 per ton. Of this amount, over $4 is allowed for freight; and yet the Georgia manufacturers are said to have a fair profit....The Martinsburg *Independent* learns that some capitalists are going to build a blast furnace at Sir John's Run, in Morgan County, Md. Iron ore of fine quality and in large veins has been found near the point selected for the erection of the furnace....F. Johnson has discovered a 5-ft. 10-in. vein of iron ore on his land near Frenchburg, Ky.....IRONDALE, W. Va., April 28.—The Irondale Furnace made its first cast to-day, and was a perfect success. This furnace has been idle over three years, until some six months ago, when some New York capitalists bought it for $20,000. They have spent some $25,000 and put it in first-class order. They expect to cast fifteen tons daily. They employ 100 men. The furnace is in Preston County, three and a half miles from the main line of the Baltimore & Ohio Railroad, on the Iron Valley Railroad. The furnace, railroad and all its fixtures originally cost $350,000. This furnace starting up again gives great satisfaction, and is looked upon as evidence of better times.... Mr. T. J. Agnew, formerly of Philadelphia, has returned from Colombia, South America, and has ordered a full equipment for a coke blast furnace. The machinery will be made in sections and transported over the mountains on the backs of mules. Pig-iron at that place costs $300 a ton....Mr. Henry Beers, who owns a little place near Dover, N. J., has found an iron mine on his place, of excellent quality. A 20-ft. shaft has been sunk, and a lease has been made to John Opie, Sr., of Dover, for $25 a month and 50 cents per ton....CLEVELAND, O., May 7.—A fire at Leetonia, O., this morning, destroyed $30,000 worth of property, consisting principally of machinery and stock of the Grafton Furnace Company and freight cars. Insured for $15,000 in Pittsburg companies.....The freight on pig-iron from Riverton to Pittsburg, a distance of 331 miles, has been reduced to $1 per ton....The capacity of the furnaces in blast in Pittsburg is 4205 tons per week, and of those out 1230 tons. The capacity of those in blast in the Shenango Valley is 2315 tons, and of those out 4090 tons. The capacity of the Mahoning Valley furnaces in blast is 1950 tons; capacity of those out, 2935 tons. In the Allegheny Valley those in blast have a capacity of 405 tons, and those out a capacity of 600 tons. The Youghiogheny Valley furnaces in blast have a capacity of 1225 tons, while those out have a capacity of only 150 tons per week.

MINING NEWS.

Special Correspondence of the Engineering and Mining Journal.

COLORADO.

GILPIN COUNTY.

During the month of April, Gilpin County shipped $93,900 worth of mill gold, $45,000 worth of smelting gold, $129,683 worth of silver from the smelting works, and about $10,000 worth of ore, or $278,583 altogether. There are now 647 stamps at work crushing ore, and 20 more soon will be.

William Nichols & Co. have leased the Susquehanna Company's 900 feet on the German lode, and will put up steam hoisting machinery at once. One of the shafts is nearly 300 feet deep. The Colorado Central Railway, now being extended from Black Hawk to Central, passes over the lower portion of this property. The Susquehanna Company has just beaten, by a decision of the Supreme Court, a black-mailing scheme to get hold of a part of its lode. The Colorado Central Railroad extension to Central is being built around the hill-sides, along or across the Bobtail, Fisk, Denmark, German, Bates-Hunter, and other valuable veins, and their ore can soon be taken to mill by rail, thus effecting a saving in transportation.

The vein of the Cashier is steadily improving as the two shafts are being sunk. The lessees of the La Crosse-Burroughs mine have fair-looking ore, but none has been milled yet. Work is being resumed all over the district in previously idle workings or deserted lodes and prospect holes. Many new windlasses can be counted on the hill-sides, and some new buildings and hoisting works. The Williams silver lode is paying the Drake Brothers largely, and other parties have begun work on either end. Next week the consolidated ditch water will enter Russell Gulch, and then the gulch mining season will begin.

An unusually rich discovery has just been made on the English-Kansas, which has so long been idle and full of water. This mine is on the eastern part of the Kansas lode, half a mile from the Monmouth property. Its rich vein would have been worked to this day had the old company's superintendents been honest and competent. James C. Fagan came into possession of the property last summer, and, just as every thing had been brought into readiness for work, the buildings and hoisting works were destroyed by fire. A substantial fire-proof stone building has since been erected, and operations were started up. A few days ago there was a cave in the mine at one side of the shaft, which uncovered a large vein of "copper-iron ore" exceedingly rich in gold. This valuable mineral is being taken in wagon loads to the smelter, where it brings large prices. Previous to this falling in of the walls and surface dirt, the presence of this ore body was unknown, and its discovery was entirely unexpected. What is remarkable about it is such rich ore in large quantities. Casey's wonderful strike on the Ophir-Burroughs in 1862-3 was made by the accidental caving in of one of the walls of the mine, and this after the owner had become heavily involved in sinking off from the main vein. The developments of recent years have made it evident that the Kansas is the leading lode of Quartz Hill, and it will undoubtedly be worked for its entire length of nearly two miles before the season is over.

The Trenton Company's concentrating works (old Collom Works) at Black Hawk were started up the last week in April. They are believed to be more successful than formerly.

CLEAR CREEK COUNTY.

The Boulder Nest mine, on Red Elephant Mountain, yielded about $100,000 in the first three months of 1878. The March product was about $40,000. April went far below those figures, but May is expected to make up the discrepancy. Tooker & Co.'s lease on the most productive part of the lode expires about June 1st. From the time the mine began to pay, September 1st, 1877, up to January, a period of four months, the yield was $117,000. The Boulder Nest was discovered less than one year ago, and is evidently on the same vein with the Free America. In sinking the main shaft of the latter, the best ore vein ever found in the property has lately been developed.

BOULDER COUNTY.

The Melvina mine in the telluride belt sent 16 tons of ore to the smelting works at Black Hawk in April, which sold for $7797.46, leaving a profit of over $6000 to the owners. During the first four months of 1878, 60½ tons of ore were sold

from this mine, for which $31,830.46 was paid, and the profits amounted to over $24,000, or nearly 80 per cent. A few tons were concentrates from the True Vanner machines, but most of the ore contained over $500 per ton just as it came from the veins. The mine is now 330 feet deep, and is supplied with steam-hoisting machinery. Ten men are employed. The Washington Avenue mine and new roasting and leaching mill have shut down because the ore is too poor to pay. Concentrating works may be put up there.

FREMONT COUNTY.

The new Mallett reduction works at Cañon City turned out their first silver brick April 25th. Mallett removed his establishment from Rosita to Cañon last fall, it being included in the works referred to above. The Maine or Bassicá mine near Rosita is paying enormously. Its ore is very rich, carrying both gold and silver, although the main value is in the former metal. This mine was discovered last year. The Rosita silver mines are generally paying, although a legal contest has limited operations on the Pocahontas. Powerful machinery is being put up over the Humboldt so that sinking can be continued to a depth of 1000 feet. The Pennsylvania reduction works are having their capacity increased to 10 or 12 tons daily.

RAILROAD WARS AND COMBINATIONS.

The contest in and around the great Arkansas cañon still rages between the A., T. and S. F. and the Denver and Rio Grande companies; and which will ultimately secure this outlet to the West, is yet a matter of uncertainty, although fortune begins to incline in favor of the former and of the heaviest banking account. The narrow-gauge men still hold some very important points in the cañon and care not for courts or sheriff's mandates. It is rumored that Jay Gould will step in and secure the Denver and Rio Grande, and thus continue his conquests South and West.

While this war progresses in Southern Colorado, very important movements among the Northern Colorado railroads are being made. Jay Gould and his Union Pacific associates have at last obtained control of the rival Kansas Pacific. It is rumored that President W. A. H. Loveland, of the Colorado Central road, is to be President of the K. P. also. This shuts out the Denver Pacific, extending from Denver north to Cheyenne, at both ends; for the new plains division of the Colorado Central will form the connecting link of the two great roads. The Union Pacific, Kansas Pacific and Colorado Central will hereafter be under one management, and will practically be one concern. This ends the *pro-rate* war between the Pacific roads, in and out of Congress. The Colorado Central has always operated with the Union Pacific, and has been extended year after year along the plains and into the mountain mining districts, until it controls the local trade of the State north of the Denver and Rio Grande road. It is the work of Mr. Loveland's genius and enterprise, and is indispensable to the prosperity of the mines and mining and trading centers. About 170 miles of track—broad and narrow gauge—are in operation, and more are building or projected. The Kansas Pacific will hereafter receive its coal supply from the new or lately re-opened coal banks along the line of the Colorado Central, thus shutting off that market for the Erie coal mines of Boulder County.

COIN.

DAKOTA.

THE BLACK HILLS.

We take the following concerning some of the prominent Black Hills mines from the *Telegraph-Herald* of the 3d inst:

Luella Carrie.—The lower tunnel is 74 feet in rock, which prospects well.

Hibernia.—Shaft down 45 feet. Free gold plentiful. The rock prospects well.

The Northwestern Company are running their 20-stamp mill on Buckeye west ore. The ore looks well. Preparations for getting out ore are being pushed as quickly as possible.

Lafayette Mine is situated on the south side of Sawpit Gulch; Messrs. Phelps & Co., owners. The mine is being developed very rapidly, two shifts working in the lower tunnel, which is now in 35 feet. It is the intention to crosscut the lead and sink a shaft 50 feet deep. The rock in this mine is turning out to be very rich. It shows free gold in great quantities, and the rock prospects very well, the gold being very coarse. This is as good a mine as there is in Sawpit Gulch.

The Alpha Mining Co. were engaged yesterday in constructing a tramway from their mine to the ore dump.

Engineers were engaged yesterday in surveying the Little Giant lode. A new tunnel will be started in a few days.

The Bald Mountain mines are looking up, and owners of the Portland and other leads are very much encouraged.

Mining Titles in the Hills.—The following letter from the Department of the Interior at Washington, settles a question which has troubled many of the residents of the gulch relative to the difference between them and the rights of surface and bed rock claimants:

DEPARTMENT OF THE INTERIOR,
General Land Office, Washington, April 23d, 1878.

Register and Receiver, Deadwood, Dakota:

GENTLEMEN—With your letter of the 23d of November last, you transmitted the papers in the case of the association of Frank Norton *et al.*, for patent from the premises described in mineral entry No. 1, lot 28, Whitewood placer mining district, Lawrence County, Dakota:

Against this application for patent a protest was filed by James McPherson and John A Nye, who alleged that there are upon the surface of said premises valuable dwellings and improvements, owned and occupied by the citizens as a town site. In all cases where mining claims are situated within town sites, the patents for such mining claims contain a clause as follows, viz.:

"Excepting and excluding, however, from their presents, all town property rights upon the surface, and these are hereby expressly excepted and excluded from the same—all houses, buildings, structures, lots, blocks, streets, alleys, or other municipal improvements upon the surface of the above described premises, not belonging to the grantee herein, and all rights necessary or proper to the occupation, population and enjoyment of the same."

Patents issued for town sites in mining regions contain a claim in accordance with the terms of the law; providing "that no title shall be acquired under this patent to any mine of gold, silver, cinnabar or copper, or to any valid mining claim or possession, held under existing laws; and provided further, that the grant hereby made is held and declared to be subject to all the conditions, limitations and restrictions contained in section two thousand three hundred and eighty-six of the Revised Statutes of the United States, so far as the same are applicable thereto."

As the proofs submitted in this case are satisfactory, patent will issue for said mining claim, in accordance with the terms of this letter.

You will inform all parties in interest, and acknowledge the receipt hereof.

Very respectfully, your obedient servant,

J. A. WILLIAMSON, Commissioner.

The B. H. *Times* has the following: "The Excelsior Mining Company is a new enterprise formed for the purpose of developing the resources of the hill in the vicinity of Gayville, in the Black Hills. Experts, after careful examination, incline to the opinion that this hill is the feeder to the rich Placer mines in Deadwood Gulch. The results thus far obtained are remarkably rich, surpassing any thing heretofore found in the hills.

"It has been generally believed that all the rich mines in the Black Hills were situated on what is known as 'the belt.' This belief is rapidly changing, in consequence of discoveries made almost daily in different sections of the country, which indicate the existence of a vein fully equal to any thing yet discovered.

"The Rockerville mining district in the Black Hills exhibits highly encouraging prospects. Sluicing has already been commenced with good results. All mining property there is held at high figures, the owners having the utmost faith in the future of the district.

"Judge Bennett and General Dawson have struck some rich gravel somewhere in this locality. From a pint of unsalted gravel they washed out with a common tin pan $2.15 of coarse gold. The judge says the gravel is from ten to fifty feet in depth and covering an area of fifteen acres in extent. They are of the opinion that the entire section is fabulously rich."

A dispatch dated Deadwood, D. T., May 7th, says: "The Father De Smet mine cleared up nearly $50,000 to-day, from sixty stamps that had been running twenty-six days."

GEORGIA.

THE GOLD FIELDS OF GEORGIA.

A correspondent of the New York *Daily Graphic*, writing from Dahlonega, Ga., under date of April 26th, gives a very interesting description of the Georgia Gold Mines, from which we make the following extracts:

"Dr. Stevenson, now living near Gainesville, Ga., is said to have discovered a vein of gold in this region in 1828, and that was the first announcement made of the extensive deposits of the precious metal in Georgia.

"The formation bearing gold in rock and supplying the alluvial deposits enters the State from the Carolinas and Virginia, and extends in an almost due northeast and southwest direction across Georgia into Alabama. I have just traversed some seventy-five miles of the belt, and yet have not touched more than one-half the distance between the extreme workings in the State. The section visited, however, from Ackworth to Dahlonega, embraces the principal developments, the latter place being regarded as the center of Georgia gold mining. In this and the adjoining counties the first work was done at the time the region was part of the Cherokee reservation. From the discovery of gold by white men up to the removal of the Indians in 1838 there was constant trouble between the Indians and white miners and prospectors, who were called 'Intruders,' and were as aggressive and indifferent to the rights of the aboriginals as their successors in the Black Hills.

"Prior to the discovery of 1828 the Indians obtained gold in large quantities from these deposits, and for a traditional period they made ornaments from the gold, copper and argentiferous galena found in and contiguous to the gold belt. After 1828 intruders poured in and the production of gold became of sufficient importance by 1837 to secure the establishment of a United States mint at this place. This continued in active operation up to the breaking out of the war, during which it was dismantled of its machinery, books, etc. After the war was over the building was donated to Georgia for a Normal College, and is so occupied at present, with about 200 pupils in attendance.

"The records of the mint have been scattered and mutilated, but Colonel Lewis, the able President of the college, obliged me with a complete record of the coinage here between the years 1843 and 1852. This record gives the suggestive items: Number of Deposits, Kind of Deposits and Amount Coined from each. Probably nothing so clearly shows the kind of mining done as the figures. In the first place, nearly all the deposits are of grain or dust gold, and but little amalgam, showing that the bulk of the mining was hand-work with the pan, cradle, jack and long tom, and comparatively little by mills, plates and quicksilver. For instance, in 1843 there was 1728 deposits which coined $570,060.53, while in 1848, when the wooden stamp mills with their European shoes and dies were more actively engaged, and quartz veins worked, there were only 893 deposits, yielding $271,752—the gravel miners bringing less, but in larger numbers, and the mills more amalgam. The small business of 1848 was owing to the rush of Georgia miners for California, following the first announcement of the discovery of gold there.

"The growth of quartz mining is shown to have rapidly increased, while the California fever drew off the multitude of surface miners. In 1852 there were 764 deposits, yielding $473,810. From this period the miners began to return from the West, and the Northern capitalists took an interest in the work, projecting developments on a large scale, but the war stopped all work in the mines except that done by individuals in a desultory manner and without machinery.

"It is extremely difficult to approximate the actual yield of the Georgia gold field. Some think the richest yield was during the ten years before the building of the mint. Certainly a very large amount was taken out. The mint was in operation about twenty-three years. From 1843 to 1852, a period that included the California exodus and the years of least production, the total amount minted was $4,171,623.03. From this it would appear reasonable to place the annual product during the twenty-three years of the mint at about $500,000 a year.

"This product assumes unusual importance when the methods of obtaining it are considered. These methods were, almost without exception, of the rudest and most primitive character, and even to this date there is scarcely a shaft in the region over 150 feet deep. In fact, I was unable to learn of any working below water level, and in the sulphurets that underlie the decomposed quartz or free gold ores. The country is scarred with pits, ditches and tunnels usually 5 to 40 feet below the surface, or only at depths convenient to the common hand windlass.

"An amusing feature of the mining here is the reliance of the native citizens of all colors on the gravel deposits for 'coffee and terbacker.' When everything else fails they go out and 'pan' *ad libitum* as to territory, and fill a quill with 'dust,' which passes current with the corner storekeeper. This is a common occupation of the young and the old in the gold districts after heavy rains, and every child knows the grocery equivalent of grain and pennyweight.

"Dahlonega is most picturesquely situated on the ridge which contains the main gold veins of the belt. Around this place are five mills that have seventy-four stamps in position, and a new mill for thirty stamps is in course of erection. The mining work here really deserves a special letter, and this is already far too long to admit of any just notice of such works as the Hand ditch, twenty-two miles long, with its 2000 feet of three-foot boiler pipe, carrying a large stream over ridges 400 feet high; and the wonderful Findly mine, where a small stream of water precipitates fifty tons of ore from a vein 500 feet above the mill upon the battery floor in five minutes. This vein I measured and found over fifty feet wide. The ore is a granulated quartz, and three miners break up a supply for the fifty-ton mill each day.

"I will close by a note of Knucklesville, renamed by John C. Calhoun, who owned a famous mine near by—Auraria. Within a radius of a few miles of this village, which is six miles from Dahlonega, there are several mines now being put in working condition, each having mills. The variety of ownership suggests the wide interest taken in these Georgia mines, and is true of the other places on the belt as well as Auraria. There is the Baggs Branch, owned and worked by Cleveland (O.) parties; the Gold Hill, owned by a Boston company, and the famous Battle Branch, now worked by the Dahlonega Company, of New York City. I found posters out asking for 100 men to work on this property, which is fairly opened and has a ditch giving a fall for sluicing of some 200 feet, also a fine water power. There are also the Logan Hill, owned by a Pittsburg (Pa.) company, and the Saltonsville, owned and actively worked by parties from Lincoln, Neb.

MISSOURI.

The Valley and Palmer mines in Southeast Missouri continue prosperous.

The Granite Mountains of this State are promised some attention by St. Louis Street Commissioners. The abominable limestone roads of the city should be replaced by what nature created for no better purpose.

Shannon and Reynolds Counties will be prospected this year for copper and other ores.

The late Professor Sheppard, the great perambulator of Missouri, is said to have first discovered the silver mine in Madison County.

At the office of the Granby Company in St. Louis is a large specimen of blende, the surface of which is most beautifully colored with copper. It was mined at Oronogo.

Col. Preston, of Joplin, passed through St. Louis on his return from Philadelphia, where he purchased machinery for the erection of ore-separating works at Short Creek, Kansas.

Professor Bartlett, of the Joplin White Lead Works, is planning the connection of all the furnaces of Joplin with one large concentrating establishment for gathering all the fumes of said works.

The production of lead in Southwest Missouri last month was very light, not exceeding 400,000 lbs. of ore per week. We can do better, but desire to give our Lake County (Colo.) friends a show. They are anxious to ship and sell lead at cost to show that they have silver. By and by we shall ship and sell our Southeast Missouri silver at cost to show that we have lead.

Two of the largest smelting establishments in Joplin are closed for repairs.

The daily shipment of 60 cars of iron ore from Iron Mountain has been reduced to 20. Evidently it does not pay to ship this ore at a small or no profit; but it pays to mine and ship lead from Colorado, profit or no profit. Prof. Bartlett, the patent white-lead man of Missouri, is badly needed in Colorado.

The Missouri Furnace, at South St. Louis, is still in blast. The charcoal furnace, or rather bloomer, of the Peckham patent, has been started at Kimwick. The proprietors claim they will make blooms as good as Swedish brand.

ARKANSAS.

The antimony outcroppings in Sevier County are being prospected again by O'Bannon & Co., who mean business.

KANSAS.

The township of Empire voted $20,000 bonds for the new railroad to Granby.

Immigrants are settling thickly on the lands of the Fort Scott and Gulf Railroad.

The heavy rains have greatly interfered with mining operations on Short Creek, where the diggings are shallow. B.

MICHIGAN.

The Quincy Copper Mine.—We make the following extracts from the annual report of this company, which was published in full in the *Northwestern Mining Journal*. The agent of the company says: "We have no reason to be dissatisfied with the results of the past year's work. The great depression in copper interests has continued, and the price of our staple has ruled lower than for many years. This has stimulated us to further and more active efforts to economize in every direction, and the result is a decrease in running expenses of fifty-one thousand dollars, while the work performed has been about the same as in the previous years. You will also observe a noticeable falling off in the percentage of rock stamped. This, I think, is to be mainly attributed to the more than usual prominence of the 'bunchy' and 'pockety' nature of our lode, which is well illustrated by the mine plans. While this has given us a larger proportion of mass and barrel work, it has also in a great measure caused the stoping of a greater amount of low-grade rock, in order to keep the stamp mill supplied."

The receipts during the year were as follows:

From 1,796,618 lbs. copper sold and delivered	$337,964.62
775,015 lbs. sold but not delivered	142,326.50
265,381 lbs. on hand, at 17½c	46,441.67
2,837,014 lbs. (average about 18·56c.)	$526,732.79
Deduct 361,428 lbs., being product 1876, included in above	57,828.48
2,475,586 lbs.	$468,904.31
Add 244,972 lbs. at mine, estimated at 15c. per lb	36,745.80
2,720,558 lbs. copper, total year's product	$505,650.11
Add from sales of silver	407.79
	$506,057.90

The cost of assorting and breaking 73,185 tons rock was as follows:

Laborers in rock house, $9495.50; engineers, brakemen and carpenters' work, $2626.22; machinists, masons and blacksmiths' work, $1250.42; wood consumed at engine, $3541.99; supplies and materials used, $1839.76; total, $18,753.89. Labor filling and running 73,385 tons rock to stamp mill, $3521.92; blacksmiths, carpenters and machinists' work, $474.26; supplies and materials used, $921.97; total, $4918.15. Labor stamping and dressing 75,307 tons, $32,181.79; supplies and materials used, $39,260.15; total, $71,441.94; surface labor, supplies and materials used, $11,176.10; taxes paid for 1877, $7074.05; legal services for 1877, $300; P. L. & R. I. Co. tolls on mineral, $336.97; incidental expenses, $796.56; total, $19,683.68.

NEVADA.

THE COMSTOCK.

From the mining summary in the Gold Hill *News* of the 1st inst. we condense the following:

"It has been found inexpedient to shut down the old Yellow Jacket works at present, as was contemplated. The drift connection recently made at the 2000 level with the Crown Point is being put in good order for sending out the rock or *débris* from the Yellow Jacket workings and explorations beyond that point, and arrangements are also being made to send out the water through it to the Crown Point and Belcher drain shaft. The principal amount of this water comes from the 'west country' above the 2000 level, and in order to reduce as much as possible the amount to be raised, a substantial dam of cut stone is now being constructed in the drift at the 1700 level. This dam will shut back the greater portion of the water. It will take two or three weeks to construct the dam, and the old hoisting works will probably not be shut down before the first of next month.

"The Sutro Tunnel is well advanced into the Comstock ledge formation, as shown by the great increase in the temperature, it being about as hot in the face of the header as it is in the Savage mine, being over 300° a few feet from the face of the tunnel, and cold air has to be forced in on the bodies of the miners to keep them from fainting. It will soon intersect the Savage mine at the 1640 level. Sutro says he can make the connection in two or three months. The total length of the tunnel last evening was 19,511 feet.

"The main drift east on the 1640 level of the Savage was started for the purpose of intercepting the Sutro Tunnel and exploring the company's ground in that direction, and why it is stopped, merely because it has run into an ore vein, is best known to the management of the Savage Mining Company. Mr. Sutro and Gen. Thomas H. Williams, President of the Savage Mining Company, met by appointment at the Savage office, for the purpose of arguing the questions and points concerning the Sutro Tunnel, but nothing definite was accomplished, the parties being unable to agree upon a basis for making the estimates. The vein is said to be a very promising one, and the lateral drifts north and south in the west wall of it are to be continued for a few days until the east drift on the 2000 level reaches the same vein, when crosscutting at both points will develop its true merits in a hurry, and in the most decisive manner.

"In the Ophir the prospect improves as the winze is sunk below the 1900 level, giving better hope for good developments at the 2000 level. Julia also shows improvement in prospects, making it the most cheerful stock on the list to-day. The outlook all along the line, although partaking somewhat of the prevailing spirit of depression, is hopeful, and any new and good development at any point will send hopes and stocks up lively again."

Below is given a tabulated quarterly statement of the proceeds of the mines of Storey County. By this table it will be seen that the gross yield of the bonanza mines—Consolidated Virginia and California—for the quarter ending March 31, 1878, is $10,048,500.69. During this time the two companies have expended $2,622,009.28, leaving a balance of $7,426,490.71, upon which taxes, for State and County purposes, amounting to $148,529.81, have been levied.

Mine.	No. of tons extracted.	Value per ton.	Gross yield or Value.	Total Cost.
California	53,330·900	$99	$5,316,655.15	$1,329,430.54
Consolidated Virginia	59,714·700	79	4,731,845.44	3,292,579.34
Challar-Potosi	2,824	17	48,767.18	65,581.76
Consolidated Imperial	3,483	12	43,965.33	50,769.80
Crown Point	3,644·950	15	57,380.52	85,264.81
Justice	6,306	19	122,342.74	128,660.00
Ophir	88	120	10 645.36	9,771.88
Trojan	4,411	6	27,306.07	68,001.24
TAILINGS.				
Mariposa Mill	480	16	8,036.17	5,458.00
Omega Mill	15,469	9	149,518.10	94,222.31
Railroad Mill	3,042	9	27,372.26	24,762.51

Mine.	Amount deducted by law.	Net yield or value upon which Taxes are levied.	Total Amount of Tax.
California		$3,987,224.61	$79,744.49
Consolidated Virginia		3,439,266.10	68,785.32
Challar-Potosi	80 per cent.	9,753.44	195.06
Consolidated Imperial	80 per cent.	8,793.07	175.86
Crown Point	80 per cent.	11,476.10	229 52
Justice	80 per cent.	24,468.55	489.37
Ophir	50 per cent.	5,322.68	106.45
Trojan	90 per cent.	2,730.61	54.61
TAILINGS.			
Mariposa Mill		2,578.17	51.56
Omega Mill		55,295.79	1,105.92
Railroad Mill	90 per cent.	2,737.93	54.76

EUREKA CONSOLIDATED.

The following official letter from the Superintendent of this mine was published in the *Sentinel* of the 1st inst.:

"Work has continued at the mine with the most favorable progress to report in the advance of drifts, etc. There has been run during the week 159 feet of drifts on the several levels, and 20 feet of incline sunk. The ore bodies are all looking much the same as ever, and continue to yield largely, with no apparent diminution in quantity. Large quantities of ore have been stoped out, and some 1400 tons hoisted and delivered at the furnaces for reduction. The furnaces have been running better this week, there being no detention to affect the yield of bullion, and the product of the week ending this morning, makes an average of 50 tons per day. Have been delayed somewhat in the continuation of the new furnace, owing to the stormy weather prevailing during the week. From present appearances, will not have it completed before the 5th of May.

"*Seventh Level.*—West drift No. 1 advanced 15 feet, and now in 197 feet from cross-cut. Drift has entered into broken limestone. East drift continued 28 feet, and now in 193 feet, with ground showing very good prospects for ore.

"*Eighth Level.*—East drift from ore chambers advanced 40 feet, and now in 137 feet, being 83 feet in ore. The ore in face of drift is now low grade.

"*Ninth Level.*—Incline winze sunk 20 feet, and now 45 feet below the tenth level, having reached a total of 250 feet. East drift from main cross-cut made 12 feet, and now in 117 feet. Have suspended operations on this drift for the present. Started drift running west from main cross-cut, and made 10 feet. Also started drift running west from cross-cut No. 1, and made 28 feet.

"*Eleventh Level.*—East drift advanced 20 feet, and now in 139 feet, having reached line of incline from ninth level. North cross-cut made 7 feet, and now in 49 feet, with indications for ore continuing very favorable."

THE PARADISE MOUNTAIN MINE.

The *Grass Valley Union* says: "This mine is reported to contain some of the richest quartz ever found in the State. In addition to the ledges already known, others are being discovered daily, and prospecting is carried on extensively with highly encouraging results. The mineral wealth of the district is said to be firmly established, and the energy and activity displayed by the residents will certainly secure its development.

"A man who has worked in nearly every mine in the county, and is at present employed in the depths of the Murchie, informs us that the strike made by that company excels for extent and richness any thing he has ever yet seen developed in this section. Where they were working yesterday the ledge had increased to the remarkable thickness of six feet; for some time it has averaged three feet, and the rock taken out is unexpectedly rich. The Murchie is rapidly stepping into the front rank of Nevada County's bonanzas."

COAL NOTES.

CHINESE UTILIZATION OF THEIR COAL DEPOSITS.—The New York *Times* has the following: "At length the Chinese, in spite of the prejudice and superstition of centuries, appear desirous of utilizing the valuable coal and iron deposits of the empire. A native company is about to develop the rich coal mines of the Province of Shantung. The coal and iron known to exist in the Province of Chili, to to the northwest of Tientsin, are also to be mined on an extensive scale. If these enterprises prove successful, the effect upon the social and commercial condition of China will be incalculable."

The New York *Sun* says: "The coal production of China is reckoned at 3,000,000 tons annually. The anthracite beds of Shansi represent 1,000,000 tons; the bituminous coal of that province, 700,000. All the eighteen provinces contain coal; and, although the extent of the coal fields and the age and quality of the coal vary, yet China may now be regarded as one of the first coal countries of the world. The area of her coal fields exceeds even that of North America, and with the greatest of them—that of Shansi—no other coal region can be compared in the union of the most fortunate conditions as regards position, quality and quantity. Along with the coal, brown iron ore is also found in great quantity. With a yearly production of 300,000,000 tons, it is estimated that this extensive bed of anthracite alone could cover the whole present demand of the world for 2400 years. But the working of the Chinese coal fields is yet so much in its infancy that the production at present, in spite of the most favorable circumstances, is only equal to about one fifteenth of the coal production of Germany or the United States."

THE COAL CREEK (COLORADO) COAL MINES.—The Golden *Transcript* of the 1st inst. contains a description of the mines of Coal Creek, from which we extract the following:

"The development of this coal property, which consists of 520 acres, commenced late last winter, when the sinking of the working shaft was begun. The bottom of this shaft is 204 feet from the surface, and is 7×17 feet in dimensions, well timbered, and divided into three compartments—two cage-ways for raising the coal, and a ladder way at one end from top to bottom of the shaft. In sinking the shaft several veins of coal were penetrated, from 18 inches to 4 feet in

thickness, and the main vein was struck at the depth indicated above. This is found lying practically flat, there being but a few inches dip to the 100 feet toward the east, and just sufficient for convenient drainage. The shaft has been sunk near the eastern edge of the property, so that all the water encountered in working the mine is concentrated in the sump, and raised to the surface by a team pump.

"The main coal seam which is now being worked is eleven feet in thickness, divided about two feet five inches from the top by a foot vein of slate, leaving a vein of solid, bright coal eight feet seven inches in thickness, which has been proved by boring to underlie the entire claim. In sinking the water-sump at the bottom of the shaft, another four-foot vein was developed seventeen feet below the main vein.

"The present force of the mine is 20 men, raising about 40 tons per day. As fast as working chambers can be opened the force of miners will be increased until the underground force will aggregate 100 men, who will be able to send up from 400 to 500 tons per day. New and improved hoisting machinery is now being prepared to meet the increased output, and rails are now upon the ground for laying track in the form of a 'Y' from the railroad to the shaft, which is located some 1000 feet distant.

"In working the mine only the 8 feet 7 inches seam is taken out at present, leaving the slate and the smaller vein above for a roof. As work progresses 'T' rail is laid down in the mine for removing the coal from the workings. When sufficiently developed, mules will be lowered to haul the cars.

"Mr. Welch, the owner of the mine, is using every exertion to get his mine and machinery in proper shape to meet any demand that may be made upon him, realizing that the supply must be largely increased along the line of the Colorado Central when three or four hundred miles of the Kansas Pacific shall commence to draw its fuel from this direction instead of from the Erie mines as at present. Wise forethought of the managers of the Colorado Central has taken in the situation in advance, and by encouraging the enterprises started along its line of road, provided for any demand that is likely to be made upon it.

"The Marshall bank, one of the best in Northern Colorado, has been connected with the Colorado Central by rail, as has also the Murphy bank, on Ralston Creek, another excellent mine that is capable of an immense output. With these, and the four splendid mines now worked at Golden, it would seem that the Colorado Central has considerable encouragement in the matter of a coal supply, and, with the completion of the Littleton road to a connection with the Denver and Rio Grande, and the Kansas Pacific under its control, will be enabled to give Kansas City and its surrounding suburbs their choice of Colorado coals at minimum rates, besides supplying fuel to the roads themselves. It will also open a way out for the superior Rock Springs coal of Wyoming to consumers along the Kansas Pacific and to points fed by it to the East."

THE MONONGAHELA COAL MINES.—We condense from the Pittsburg *Dispatch* of the 3d inst. the following from a circular letter of William Wilcox, Inspector of Mines for the First District: "I have just completed my first round of the mines in my district, about two hundred and thirty in number. At the time of my visit, a number of the mines of the Monongahela valley were, as far as ventilation is concerned, in a very poor condition, but it is only just to say that the operators, one and all, expressed their willingness to comply with the requirements of the law, but as times were so hard, asked for a little time in which to complete the arrangements necessary to that end. They have now had time to make these arrangements, and I hope no further excuse will be offered. But if any have not made such arrangements, they will do so at once, for the law must be respected, and the mines properly ventilated.

"At quite a number of mines I find men in charge who know little of the laws governing underground ventilation, and I find this to be the case more particularly in the coke region, where the double task of looking after the coke ovens and the pit devolves on the same individual; the products of the coke ovens occupy the attention of the pit-boss more than the mines, hence the mine is often neglected to the great injury of the miner and operator alike; the result is a waste of property and bad ventilation. The mines in the coke region are much worse than the Monongahela valley mines. Very few have any artificial means and consequently little or no ventilation beyond the main headings, the cross headings in some cases being totally neglected; and it is not an uncommon thing to find plenty of good pure air where the men are not working, and where the men are working little air in circulation. This order of things can and must be changed; but a proper knowledge and attention to the subject in hand is required by the parties in charge of the mines. Before air can be made to circulate in a mine, air courses must be driven, stopings must be built, doors must be hung, and some artificial means applied, capable of moving a sufficient amount of air to render the mines safe and healthy to work in; hence the necessity of operators laying out the workings of a mine with a view to their proper ventilation and drainage. The best ventilated mines are those where artificial means are employed. Among the latter are Horner & Roberts, at Elizabeth; Patterson & Co., at Coal Bluff; William H. Brown's heirs at the Old Eagle and Black Diamond mines, near Monongahela City; Gray & Bell, at Saw Mill Run, the Pennsylvania Gas and Westmoreland Coal Company, on the Pennsylvania road, and a number of others. At all these mines the air is properly distributed around the working, and there neither is nor can be any just cause of complaint of bad air in the mine. This shows that the subject is of a practical nature, and is represented by the outlay of a few dollars. A number of the firms are making improvements to their mines. Jones & Laughlin have built a good furnace to ventilate their large mine; Lynch & Robinson, at Webster, are doing the same thing. Great credit is due to all the above firms for their efforts to put their mines in a safe and healthy condition, thereby rendering complaint of bad air on the part of the miners, unnecessary."

THE ANTHRACITE COAL FIELDS OF THE WEST.—The Arizona *Sentinel* of the 27th ult. has the following: The anthracite coal fields of Sonora, New Mexico, have recently been thoroughly examined by competent experts. Their extent is not yet fully known, but surpasses all previous reports of it. Mr. Napoleon Graf, of the famous Barrancas mine, has located some 9000 (nine thousand) acres, on every part of which coal is found. On getting down from the surface the coal is found in great purity; analysis now shows 90 to 94 per cent of carbon, no trace of sulphur, and little or no silex. The ash is white and feathery as that of willow charcoal. The facility with which a railroad can be built from these coal beds to Guaymas gives them great value, and will in time make that port a center of reduction works for the base metal ores of Southern Arizona. General Rosecrans has gone down there now, and is liable to get hold of something good."....The coal shipments by river from the Monongahela region were larger last year than ever before, being 86,936,500 bushels. The shipments for 1874 were 62,586,100; for 1875 they were 56,881,625, and for 1876, 62,395,000 bushels.

CIRCLEVILLE, Ohio, May 6th.—Parties prospecting for coal on the farm of Isaac E. Dresbach, south of this city, have struck a four-foot vein at a depth of 20 feet. Operations will commence on the adjacent territory immediately, and several shafts will be sunk.

The endeavor of the Rhenish Prussian coal mine operators to compete with English coal is making itself felt at Hamburg, Germany, where, in consequence, England's imports were decreased from 18,000,000 to 16,000,000 tons last year....Coal mining in Japan is said to be progressing very rapidly, and will interfere with shipments of English coal to that portion of the globe.... The Hawk's Nest (W. Va.) Coal Company contemplate erecting a furnace and glass works. Its coal is an excellent cooking fuel....An eight-foot vein of cannel coal has been discovered about a mile from Ebensburg on Breakneck Creek, Pa. ....A good vein of cannel, four feet in thickness, has been found at Canfield, Mahoning County, Ohio, only 90 feet below the surface.

NOTES.

ENTRANCE EXAMINATIONS for the New School of Mechanic Arts occur at the same time as those for the Massachusetts Institute of Technology, viz.: June 3d and 4th and September 25th and 26th.

RESEARCHES ON THE THEORY OF FLAMES—R. A. MEES.—The author reviews the two rival theories of the luminosity of flame—that of Davy, which ascribes the light to the incandescence of solid particles, and the more recent view of Prof. Frankland, who traces it to incandescent gaseous particles. M. Mees considers that all the phenomena hitherto observed may be explained by Davy's theory, as well as, if not better, than by that of Frankland. He has also arrived at experimental results, from which it appears clearly that the flame of carbureted hydrogen differs essentially from the majority of other flames which he has studied, and which render it probable that there are actually particles in this flame.—*Chemical News.*

SIEMENS' HARDENED GLASS.—The process of manufacture of Dr. F. Siemens' compressed hard glass has, it is stated, been brought to such perfection that the hard glass is not only more easily but more cheaply manufactured than the ordinary glass. The power of resistance varies from eight to ten times that of ordinary glass. The serious objection made to hard glass at the time of its discovery, that it often fell to pieces when entirely unexposed to pressure, has been successfully avoided. This property was found to result from over-hardening, and it is now possible to detect all articles which have acquired it, by the use of the polarizator, under which over-hardened glass shows a prevalence of violet tints. This condition is also detected by exposure to water at a certain temperature.

ROBERT JULIUS VON MAYER.—The death of Dr. Mayer, of Heilbronn, Würtemberg, took place on the 20th ult. He held a position in the front rank of modern discoverers, and his name will always be coupled with that of Dr. Joule in the history of the mechanical theory of heat. No more far-reaching hypothesis has ever been introduced into science, and it is to be said for Dr. Mayer that his large share in developing it was the more creditable because his work was done under great disadvantages. His merits were not fully recognized, and his views and experiments were the occasion of bitter controversies. The period of his discoveries is from 1842 to 1851. Shortly afterward, disappointment in not obtaining fair recognition for his labors, combined with the overstrain of severe work and study, injured his mental powers; and though he recovered his reason, he was incapacitated for scientific research in more recent years.

SOLID SULPHURIC ACID.—Stark's extensive sulphuric acid works in Bohemia, which produce the Nordhausen sulphuric acid on a very large scale from aluminous slate, have lately commenced to put the pure anhydrous solid sulphuric acid on the market. It is put up in tightly-soldered tin—tinned iron—boxes, which were found to answer best, because at ordinary temperatures sulphuric anhydride is without action upon metals, and particularly upon tin. This form of acid is very useful, and its transportation by far less risky than when shipped in a liquid form. The constantly growing production of artificial alizarine has been chiefly the cause of this innovation, it being well known not only that large quantities of fuming sulphuric acid are required for its preparation, but also that the yield and quality of the product depend upon the degree of concentration of the oxidizing agents.

PLATINUM-COATED IRON.—M. Dode, of Paris, the well-known discoverer of the platinum-mirrors, has invented and patented a process for coating iron with platinum. The iron first receives a coating composed of lead and copper, and then the platinum is applied. The first coating is prepared by mixing 22 parts of borate of lead and 4½ parts of cupric oxide in oil of turpentine, and is applied by means of a fine brush. The platinum coating is prepared by converting ten parts of platinum into chloride and mixed with five parts of ether and permitted to evaporate in the air. The residuum is mixed with a viscid combination of 20 parts borate of lead, 11 parts red lead, and some oil of lavender, and 50 parts of amylalcohol added to the whole. In this mixture the object to be platinized is dipped, allowed to dry in the air, and then heated to a moderate temperature.

EXPERIMENTS WITH FLOATING MAGNETS.—Professor A. M. Mayer describes, in the *American Journal of Science and Arts*, some entertaining and easily performed experiments in magnetism. Several sewing-needles, No. 5 or 6 size, are magnetized with the same polarity, so that all their points are north. Each needle is passed into a small cork that will just float it upright; the corks may be ¼ inch long and ⅜ inch across. The eye of the needle should barely be above the surface of the cork. Three, four or more of these needles are thus to be floated in a basin of water, and the north pole of a large cylindrical magnet is to be brought down over them. They will immediately take geometrical positions, the figure formed being the smallest when the magnet above is brought most closely to them. Three needles thus take position at the points of an equilateral triangle; four form a square, or a triangle with one in the center; five form a pentagon, or a square with one in the center; six form a pentagon, with one in the center of a triangle of three to a side. Professor Mayer has obtained regular figures up to a combination of twenty needles. Some of the forms are stable; the needles may be sent out of the unstable into the stable forms of vibration. The experiments may be varied to any extent by the use of two or more magnets, inducing separate combinations. The figures are peculiarly suggestive of molocular action and aggregation, and may be shown to great advantage by means of a vertical magic lantern.

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for Gold.....	$2 00	Assay for Copper.....	$2 00	Assay for Zinc.....	$3 00
" Silver.....	1 50	" Lead.....	1 50	Zinc Analyses.....	5 00
" Gold & silv'r	2 00				

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to

ENGINEERING AND MINING JOURNAL, 27 Park Place, New York. (P. O. Box 4404.) | Western Office, ENG. AND MINING JOURNAL, Denver, Colorado.

ASSAYS.

New York Office:

CXLVII. O. W. DAVIS, Jr.—Sample of dark limestone containing copper pyrites assayed copper 0·21 per cent.

CLVII. L. H.—Sample marked 501 contains gold 1·60 oz.; silver 0·65 oz. per ton.

CLVIII. L. H.—Sample marked 506 contains gold traces, silver none.

CLIX. L. H.—Sample marked 804 contains silver 17·8 oz. per ton; traces gold only.

CLX. L. H.—Specimen marked 1604 contains neither gold nor silver.

CLXI. J. C. P., St. Louis, Mo.—Sample contains gold 0·02 oz. per ton.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending May 4, and years from January 1:

TONS OF 2240 LB.	1878.		1877.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co..	27,684	679,462	54,304	696,059
D. L. & W. RR. Co.	27,292	557,150	53,305	676,942
Penn. Coal Co.....	581	168,926	21,715	321,112
L. V. RR. Co.....	10,415	214,736	24,507	331,159
P. & N. Y. RR. Co..	.....	7,553	1,205	15,694
C. RR. of N. J.....	14,064	265,429	25,468	461,779
Penn. Canal Co....	*	32,448	15,065	50,716
	80,036	1,925,674	195,569	2,553,461
Lehigh Region.				
L. V. RR. Co.....	39,753	665,903	68,348	878,802
C. RR. of N. J.....	8 180	310,164	28,012	469,926
D. H. & W. B. RR..	.....	5,962	63	5,688
	47,933	982,029	96,423	1,354,416
Schuylkill Region.				
P. & R. RR. Co....	165,802	1,007,795	158,327	1,678,066
Shamokin & Lykens Val....	21,030	174,956	12,609	159,368
	186,832	1,182,751	170,936	1,837,434
Sullivan Region.				
Sul. & Erie RR. Co.	284	10,197	113	3,988
Total.....	315,085	4,100,651	463,041	5,749,299
Increase.....	.....	.....	.....	.....
Decrease.....	147,956	1,648,648	.....	.....

* This report was not received this week.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

Receipts and shipments of coal at Chicago Ill., for the week ending May 4, and year from January 1:

	Week. Tons.	Year Tons.
Receipts.....	40,004	367,565
Shipments.....	4,426	63,318

Belvidere Delaware Railroad Report for week ending May 4:

	Week.	Year. 1878.	Year. 1877.
Coal for shipment at Coal Port (Trenton).....	.....	.....	5,092
Coal for shipment at South Amboy	6,290	160,426	207,294
Coal for distribution.....	1,494	54,098	59,640
Coal for Company's use.....	1,019	28,607	27,875

Perth Amboy Business:	Tons.
Received for the week..	7,592
Shipped for the week.....	8,606
On hand May 4.....	61,652

The Production of Bituminous Coal for the week ending May 4, was as follows:

Tons of 2,000 lb., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.....	38,466	345,380
Barclay Region, Pa.		
Barclay R. R., tons of 2,240 lbs.....	4,996	105,355
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.....	2,269	46,885
*East Broad Top.....	464	22,906
Clearfield Region, Pa.		
*Snow Shoe.....	137	10,197
*Tyrone and Clearfield.....	6,665	385,774
Allegheny Region, Pa.		
*Pennsylvania R. R	1,183	63,966
Pittsburgh Region, Pa.		
*West Penn R. R.....	1,202	70,471
*Southwest Penn. R. R.....	47	9,734
*Penn & Westmoreland gas coal, Pa. R. R..... ...	6,008	249,338
*Pennsylvania R. R.....	2,766	121,604

*For the two days ending April 30.

The Production of Coke for the two days ending April 30:

Tons of 2000 lbs.	Week.	Year.
West Penn R. R....	379	24,814
Southwest Penn. R. R..... ...	5,474	257,073
Penn. & Westmoreland Region, Pa. R. R.	458	20,596
Pittsburg, Penn. R. R.....	759	28,315
Total...	7,070	330,798

Grate.....	$3.65	Stove.....	$4.00
Egg.....	3.75	Chestnut.....	3.50

Tons.	May 1.	M'ch 27.	Tons.	May 1.	M'ch 27.
6,000 St. Bt....	3.30¼	3.25	20,000 Stove....	3.77	3.69
10,000 Broken..	3.30	3.22	7,000 Chestnut	3.15	3.18
7,000 Egg	3.45	3.40			
			Average....	3.49	3.47½

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 10, 1878.

Anthracite.

Our report of the condition of the anthracite coal trade has become as monotonous to us as to our readers. On every side we get the same old story—"Nothing doing." It will soon be time for the Board of Control to meet, and its action, as regards June prices is looked to with much interest by many. The bituminous trade is hoping that the rates may be advanced, expecting thereby that their trade will be greatly increased. There is a strong conservative element in the anthracite trade that believes that no change should be made before August, and it may have some influence at the coming meeting of the Board.

A successful combination is dependent on a large business at artificially high prices. The arbitrary although moderate advance that has been made in prices has already diminished the consumption and diverted trade, and it now remains to be seen if a further advance will not become even more serious in its effects.

Matters appear to be quite harmonious in the combination, the only thing giving any dissatisfaction being the low prices adopted by the Anthracite Coal Association for Buffalo shipments. The object of the Association in this has been, undoubtedly, to prevent coal being shipped from New York. The only object in this coal seeking a Western market has been to prepare for war in time of peace, and the effort to keep it out is an indication that things are not expected to be lovely always.

Coal, in seeking a new market, stands at a disadvantage owing to consumers being unfamiliar with its qualities, and it is the desire of the Reading and other companies, who ship through the Erie Canal, to have their coal well known in every market, so that when it comes to "every one for himself," they may hold every advantage possible.

The production of anthracite coal last week was 315,085 tons; the previous week 178,252 tons, and 463,041 tons the corresponding week of last year. The production from January 1st to May 4th was 4,100,651 tons, as compared with 5,749,299 tons for the like period of 1877, showing a falling off this year of 1,648,648 tons.

Bituminous.

A contract for a year's supply of coal to the Bremen line of steamships is reported to have been made for Cumberland coal. The total quantity required will probably be about 30,000 tons. It has also come to light that the Hamburg line has renewed its contract with the same firm who furnished it with Clearfield coal last year. This contract will probably call for 65,000 tons. Outside of this we learn of no further important contracts, although there is more business pending. The manufacturing and incidental business is improving. During the week Clearfield prices are reported to have been very low, indicating that the Pennsylvania R. R. realizes that the Baltimore and Ohio has been getting the better of it in the contest for the business of this year. We are unable to trace special drawbacks, but accusations come from both Cumberland and Clearfield, and, upon the whole, there is the appearance of a growing war cloud. At the very low prices at which some of the late contracts have been made, we fail to see cause for envy on the part of those who did not secure the business.

New York.

Wholesale Prices of Anthracite Coal for April Delivery f. o. b. at Tide Water Shipping Ports, per ton of 2,240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.	$	$	$	$	$	$
Lackawana, at Weehawken	3 50	3 50	3 50	3 60	3 90	3 50
*Pittston, at Newburg.....	3 35	3 35	3 35	3 45	3 75	3 10
Wilkesbarre, at Pt. Johnson	3 50	3 50	3 50	3 60	3 90	3 25
L. Val. Coal Co., at Amboy.	.....	.....	3 50	3 60	3 90	3 25
Kingston at Hoboken.....	3 50	3 50	3 75	3 60	3 90	.....
Plymouth R.A., at Pt. John.	.....	.....	3 50	3 70	4 00	3 35
LEHIGH COAL.						
Old Company's. at Pt. John.	4 00	.....	3 75	3 75	3 90	3 25
Honey Brook L. at Pt. John	3 75	.....	3 75	3 75	3 90	3 25
L. V. Coal Co., at P. Amboy.	4 00	.....	3 75	3 75	3 90	3 25
Mount Pleasant, at Hobok'n	4 00	.....	3 75	3 75	3 90	3 25
Hazleton, at Hoboken....	4 00	.....	3 75	3 75	3 90	3 25
Cross Creek, at Port John.	4 00	.....	3 75	3 75	3 90	3 25
Sugar Loaf at Perth Amb'y	4 00	.....	3 75	3 75	3 90	3 25
SCHUYLKILL COAL *at Pt. Richmond, Phila.*						
Hard White Ash.....	3 25	3 25	3 25	3 35	3 55	3 00
Free-burning W. Ash.	.....	.....	3 15	3 25	3 55	3 00
Schuylkill Red Ash.....	.....	.....	.....	3 50	3 60	3 00
Lorberry.....	.....	.....	3 60	3 60	3 60	.....
Lykens Valley Vein.....	.....	.....	3 60	3 75	3 75	.....

* Fifty cents per ton additional for delivery in New York.

Wholesale Prices of Bituminous Coal.

DOMESTIC GAS COALS.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Pennsylvania—		
At Greenwich, Philadelphia	$4 70	$5 50
At S. Amboy.....	5 00	5 50
Kanawha at Richmond	4 10	5 40
Red Bank Cannel, Pa., at Philadelphia..	8 00	8 50
Youghiogheny, Waverly Co., at Balt ...	4 50	5 65
Despard, West Va.....	4 50	6 00
Murphy Run, West Va., at Baltimore..	4 50	5 85
Fairmount, West Va., " " ...	4 40	5 70
Newburg Orrel. Md. " " ...	4 50	6 00
Cannelton Cannel, West Va		10 00
" Splint " at Richmond.	6 00	7 00
" Gas Coal at Richmond	4 00	5 65
Peytona Cannel, W. Va., at Richmond...		10 00

MANUFACTURING AND STEAM COALS.

Cumberland at Georgetown and Alexandria	2 85@3 10	4 35@4 50	
Cumberland, at Baltimore.....	3 10@2 25	4 35@4 50	
Cl'rfi'd "Eureka" and "Franklin."			
At mines.....	0 75	....	....
At Baltimore.....	3 25	....	4 50
At Philadelphia.....	3 25	....	4 50

FOREIGN GAS COALS.

	Sterling.	Am. cur'ncy.
Newcastle, at Newcastle-on Tyne.....8s.6d.@10s.6d.		$5 50@ $6 00
Liv. House Orrel, at Liv.....	25s.	13 00
Ince Hall Cannel " ....,	35s.6d.	18 00
" Gas Cannel "	25s.6d.	10 00@ 10 50
Scotch Gas Cannel, at Glasgow, nominal.....	25s.	7 50
	Gold.	
Bl'k House, at Cow Bay, N.S.	$1 75	$4 50
Caledonia, at Pt. Caledonia.	1 50	4 25
Glace Bay at Glace Bay....	1 60	4 25
Lingan, at Lingan Bay.....	1 75	....
Intern'l Mines, at Sydney...	1 75	4 50
Pictou, Vale Mines, at Pictou	2 00	4 70

Retail Prices.

Per ton of 2,000 lb.

Anthracite.

	G. & Egg.	Stove	Chest'
Pittston coal delivered.....$5 00	$5 00	$5 00	
Lack. coal, delivered below 59th St.	4 50	4 50	4 50
Wilkes-Barre, delivered	4 50	4 75	4 50
Lehigh and Locust Mount. del'd	5 00	5 00	4 75

Bituminous.

Liv. House Orrel.....$18 00	American Orrel.....$11 00		
Liv. House Cannel... 18 00	Red Bank Cannel..... 7 00		
Am. " 11 00	Cumberland.. ..... 9 00		
Ca'n'l't'n Bl'k, or splint. 10 00			

Baltimore. May 6, 1878.

[Specially reported.]

Wholesale Prices per ton of 2240 lb. In cars at Depot N. C. R. R.

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.

Lump and Steamboat...$3.95	Stove..... .....$4.25		
Broken..... 3.95	Chestnut..... ..... 3.70		
Egg 4.05			

LYKENS VALLEY RED ASH.

Broken.....$4.15	Stove.....$4.45		
Egg..... 4.25	Chestnut..... 3.90		

From wharf or yard to the trade, 50c. per ton additional. Afloat by cargo per canal barge, 15c. per ton less than in cars.

Boston. May 8, 1878.

The market for anthracite continues very dull, and prices are nominally unchanged. Gas coals have been arriving quite freely, and are delivered on contract to the gas companies. Freights are easy, quoting 80 from New York, $1.10 from Philadelphia, $1.25@1.35 from Baltimore, and $1.35@1.45 from Alexandria and Georgetown.

We quote Boston wholesale prices as follows:

Anthracite, broken	$4.35	Caledonia	$4.50
" egg....	4.40	Newcastle	4.25
" stove ..	4.70	Cannel, English	18.00
Franklin.....	5.75	" Library	15.00
Cumberland.....	4.50	" Buckeye	11.00
Clearfield.....	4.50	Penn.....	6.25
Westmoreland.....	6.25	Youghiogheny.....	6.25

—*Commercial Bulletin.*

Buffalo. May 1, 1878.

[Specially reported by C. M. UNDERHILL.]

The Scranton, Wilkes-Barre, Plymouth, Shamokin and Delaware and Hudson (Lackawanna) coals are quote d at the following prices per ton of 2000 lbs.:

	DELIVERED AT			
	Elmira.	Ithaca.	Syracuse	Rochester.
	Afloat.	Afloat.	Afloat.	Afloat.
Lump.....	.....	.....	.....	.....
Grate.....	$3.50	$3.15	$3.15	$3.40
Egg.....	3.60	3.25	3.25	3.50
Stove.....	3.70	3.50	3.50	3.75
Nut.....	3.60	3.25	3.00	3.25

	DELIVERED AT				
	Oswego.	Erie.	Buffalo.		
	F. O. B.	F. O. B.	Afloat.	F. O. B.	Ret. Del.
Lump.....	.....	.....	.....	.....	.....
Grate.....	$3.55	$4.05	$3.65	$4.05	$4.65
Egg.....	3.65	4.15	3.75	4.15	4.75
Stove.....	3.90	4.40	4.00	4.40	5.00
Nut.....	3.40	3.90	3.50	3.90	4.50

Cost of coal from Erie, Oswego, Sodus Point or Charlotte for Western market, same as if shipped from Buffalo.

[Specially reported by LEE & LOOMIS.]

Per ton of 2,000 lb. delivered on cars.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville coke...	$4.75	.....	.....	.....
Brookfield Coal.....	3.80	.....	.....	.....
Briar Hill.....	3.65	.....	2.85	.....
"	3.25	.....	.....	.....
Youghiogheny.....	4.00	.....	.....	.....
Monterey.....	.....	.....	.....	.....
Catfish.....	3.10	2.70	.....	.....
Stoneboro.....	.....	.....	2.50	1.80
Sterling Cannel.....	4.50	.....	.....	.....
Cameron.....	.....	3.00	.....	.....
Hillside.....	.....	.....	.....	1.80

COAL CIRCULAR NO. 1.

OFFICE OF THE ANTHRACITE COAL ASSOCIATION, 221 MAIN ST., BUFFALO, N. Y., May 1, 1878.

The Delaware, Lackawanna & Western Railroad Company will sell their Scranton coal; the Delaware & Hudson

Canal Company will sell their Lackawanna coal, and J. Langdon & Company will sell their Henry Clay and Mt. Carmel Black Diamond coals at the following prices per ton of 2000 pounds, for Buffalo local trade, for the preseat:

	F. O. B.	To dealers. On car or boat.	On yard, screened.	To consumers. Delivered at retail.
Grate	$4.05	$3.65	$3.75	$4.85
Egg	4.15	3.75	3.85	4.75
Stove	4.40	4.00	4.10	5.00
Chestnut	3.90	3.50	3.60	4.50
Blossburg	4.15	3.75	3.90	4.75

Dealers will always find a full supply of all sizes, both in cars and on dock, at our yards as follows:

Lackawanna coal at 667 Exchange street, also at foot of Ohio street; Scranton, Henry Clay and Black Diamond coals at yard foot of Genesee street.

C. M. UNDERHILL, General Salesman.

Cincinnati, O. May 6, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

Per bushel of 72 lbs.

	Retail delivered.	Wholesale afloat.
Youghioghney	11c.	7½c.
Camden	9c.	5½c.
Cannel	17@18c.	13c.

Anthracite, delivered, $7@$8 per ton of 2,000 lbs.

Chicago, Ill. May 6, 1878.

[Specially reported by Messrs. RENO & LITTLE.]

Retail prices of coal delivered per ton of 2,000 lb.

Lackawanna Stove	$6 75	Erie and Brier Hill	$5 50
" Chestnut	6 75	Wilm'gton & Ill.	$3 50@4 00
" Grate	6 75	Blossburg	6 50
" Egg	6 50	Piedmont	7 50

Cleveland, O. May 6, 1878.

[Specially reported by F. A. BATES, Esq.]

Per ton of 2,000 lb. f.o.b. vessels.

WHOLESALE.

Brier Hill (Church Hill)	$3.25
" " No. 2 Grades	3 10@3.15
Monday Creek	2.70
Straitsville Lower Vein	2.70
Hocking Valley	2.70
Massillon (No. 2 grades 15 cents less)	2.70
Tuscarawas Valley	2.25
Columbiana	2.25
Nut coal, various grades	1.70@2.15
Screenings " "	1.25@1.50
Youghiogheny gas coals	3 60

RETAIL TRADE.

	1 to 10 tons Tons.	Upw'd
Brier Hill lump	$4 60	3 75
Massillon and Mineral Ridge lump	3 75	3 50
" " " nut	3 50	3 25
Straitsville Lower Vein and Hocking lump.	3 60	3 35
" " " nut	3 40	3 15
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 00	2 75
" " nut	2 50	2 35
Lacka'a., Wilkes-Barre and Pittston egg and grate	6 10	5 85
Lackawanna, Wilkes-Barre and Pittston stove	6 25	6 00
" " " " chestnut	6 25	6 00

Lehigh $1 per ton higher.

All sales to be strictly cash with order or C.O.D.

Hamilton, Ont. May 6, 1878.

[Specially reported by H. BARNARD.]

Retail prices delivered per ton of 2,000 lb.

Scr. or Wilkes-B. Grate.	$5 00	Lehigh Lump	$6 00
" " Egg	5 00	Brier Hill	5 50
" " Stove	5 25	Massillon	4 50
" " Nut	5 25	Smithing	5 50

Indianapolis, Ind. May 6, 1878.

[Specially reported by Messrs. COBB & BRANHAM.]

WHOLESALE BITUMINOUS.

On board cars, per ton of 2,000 lb.

White River	$2 65	Hocking Valley	4 25
Brazil Block	2 60	Raymond City	4 60
Highland, grate	2 25	Youghiogheny	4 60
Indiana Cannel	4 60	Blossburg (smithing)	6 10
Peytona	5 75	Piedmont "	6 10

Per car, 12 tons.

Block coal, nut	$18 00	Block Slack	$17 00
Highland, "	18 00		

RETAIL BITUMINOUS.

Delivered per bushel of 70 lb.

White River	13c.	Block Nut, steam use	8c.
Brazil Block	13	" Slack, "	7
Highland Grate	11	Virginia Cannel	25
Block Nut, domestic use	11	Youghiogheny	18
Highland Nut, " "	11	Blossburg	26
" " steam	8		

GAS COKE.

Per bushel, measure containing 2,888 cubic inches.

Retail, crushed	14c.	Wholesale	9c.
" lump	12		

ANTHRACITE.

Per ton of 2,000 lb.

Wholesale on Cars.		*Retail delivered.*	
Wilkes-Barre, all sizes	$5 75	Wilkes-Barre, all sizes	$7 50
Lackawanna, "	6 25	Lackawanna, "	7 00
Lehigh "	6 75	Lehigh, "	7 00

Louisville, Ky. May 6, 1878.

[Specially reported by Messrs. BYRNES & SPEED.]

Wholesale per bushel of 72 lb.

Pittsburg	8c.	Raymond City	7½c.
Ashland (Ky.)	7	Kentucky, on cars	8

Retail.

Pittsburg	$3 00	Anthracite, per ton	$7 50
Raymond City	2 75	City Made Coke, per bsh	7c.
Ashland (Ky.)	2 50	Soft Coke, per bushel	7c.
Pittsburg nut	2 50		

Milwaukee, Wis. May 6, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

Retail price per ton of 2,000 lb.

Anthracite, Egg, Chestnut and Stove			$6 50
Lehigh lump	$7 00	Connellsville coke on	
Brier Hill	5 25	RR. track	7 25
		Straitsville	4 80

Montreal. May 6, 1878.

[Specially reported by Messrs. ROBERT C. ADAMS & Co.]

Wholesale per 2,240 lb.

Scotch Steam	$4 75	Cape Breton Steam	$4 25
Pictou	4 50	Newcastle Smith's	6 00

Anthracite at retail, per 2,000 lb. delivered.

Stove	$6 50	Chestnut	$6 00
Egg	6 00		

New Orleans, La. May 6, 1878.

[Specially reported by Messrs. C. A. MILTENBERGER & Co.]

PITTSBURG COAL.

At wholesale (by boat-load) .. 32½@35c. per bbl. of 180 lb.
To steamboats .. 50c. " "
" manufactories .. 50c. " "
" families .. 60c. " "
In hhds. (for shipment) .. $6.00 per hhd. from 5 to 6 bbls.

ANTHRACITE COAL.

Per ton of 2,000 lb.

At wholesale .. $7 00 to $8 00
To families, etc .. 9 00 to 10 00

ST. BERNARD (KY.) COAL.

To steamboats .. 40c. per bbl. of 180 lb.
" families .. 50c. " "
Virginia cannel to families .. $1.00 " "

Pittston, Pa. May 6, 1878.

Pennsylvania Coal Company's Coal in Yard.

Retail per ton of 2,000 lb.

Lump, Egg, and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, 50 cents per ton additional.

Pittsburg. May 9, 1878.

COAL.—The large run of coal last week found overstocked markets below; none of any account was sold; nearly all is left on board to await sales after previous supplies are disposed of. This employs nearly all the Pittsburg tonnage, as the vessels are not unloaded and returned until their cargoes are sold.

There has been nothing further done by the operators' league about extending the suspension of work in the mines; the only joint action has been to limit the pay for mining to 2½ cents a bushel, or 66⅔ cents a ton. As 100 bushels is not an uncommon quantity for a miner to take out in a day, this pay would come to about $2.50 a day, or $15 a week. But few of the collieries are being worked now, though there is no concerted restriction, and proprietors are at liberty to do as they please, being only restrained on miners' wages. But few empty coal vessels have been returned, and were there a disposition to mine largely, it could not be done for want of empty craft to put the coal in. For these reasons the business is remarkably dull, and will be likely to continue so until fall. There is not the slightest change to note in quotations:

PRICES PER TON OF 2000 LBS.

Wholesale, on board	5 cts. per bush.	$1.30 per ton.	
Retail, delivered	7 cts.	"	1.84 "

COKE.—There is no great industry that moves onward with less fluctuation than this. The demand is steady and the production is adjusted to it, in which condition the business is likely to remain until brisker times and new enterprises requiring it for consumption are entered upon. There is no change in price. We give quotations of home rates, in which 40 lbs. make a bushel and 50 bushels a ton.

Wholesale, per bushel,	4@4½c.; per ton		$2.00@2.25
Retail, "	5@5½c.; "		2.50@2.75

The prices at other points where the Connellsville coke goes are the same as here, with the transportation added. —*American Manufacturer.*

Richmond, Va. May 6, 1878.

[Specially reported by S. H. HAWES, Dealer in Coal.]

Per ton of 2,240 lb. f.o.b.

Kanawha Cannel	$9 00	New River Bituminous	$3 70
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston	5 70	Norwood Gas and Steam Coal	2 70
Kanawha Gas Coal	4 90		

Sandusky, Ohio. May 6, 1878.

[Specially reported by C. E. BLACK, Agent Con. Coal and Mining Company.]

We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lb.

ANTHRACITE.

	Grate.	Egg.	Stove.	Chest
Lehigh	$6 50	$6 50	$6 50	$6 50
Wilkes-Barre	5 75	5 75	5 75	5 75
Lackawanna	5 75	5 75	5 75	5 75

BITUMINOUS.

Massillon	$3 00	Straitsville	$2 70
Del Carbo	2 75	Shawnee	2 70
Hocking Valley	2 70	Blossburg	4 75

Prices retailed delivered 50c.@75c. above car prices.

San Francisco. May 2, 1878.

COAL.—Imports from January 1st to April 1st, 1878:

	Tons.		Tons.
Anthracite	3,029	Vancouver Island	34,684
Australian	9,912	Seattle	16,211
Coos Bay	5,995	English	13,836
Cumberland	349	Mt. Diablo	23,040
Bellingham Bay	1,975		

Latest advices from Australasia report extensive shipments to this coast, both from Sydney and Newcastle, and at extremely low rates of freight—say from the latter port, 15s. down to 10s.; in fact, one or two vessels were reported taken at 8s., but this latter report lacked confirmation. We are, however, advised of two or more cargoes sold here to arrive at $6@6.50, with more sellers than buyers, even at this low range. It is said that between the sailing of the colonial steamers to this port nine vessels had sailed from Sydney for this city with 9733 tons, and at the date of steamer's sailing for San Francisco there were over twenty vessels loading coal at Sydney and Newcastle for this port, and generally under home orders. Of course, all looking to California for wheat charters to the United Kingdom, hoping to make good the low coal freights hither. The arrivals here during the week under review have been few; nevertheless, the coast supply is so constant and liberal that low prices are sure to rule for the balance of the year. The bark Fresno is at hand with 2030 tons Seattle. The City of Panama brings 780 tons Nanaimo. The ship Ericsson is at hand from Nanaimo with 2300 tons coal; also the South American from New York, with 275 tons.—*Commercial Herald.*

St. Louis, Mo. May 6, 1878.

Reported by JAMES J. SYLVESTER, Secretary of the Anthracite Coal Association.]

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

	Per ton.		Per ton.
Lackawanna	$8 00@8 50	Schuylkill	$8 00@8 50
Wilkes-Barre	8 00@8 50	Lehigh	9 00@9 50

BITUMINOUS.

Blossburg	$9 00	Big Muddy	$3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connells. Coke	6 50

Toledo, Ohio. May 6, 1878.

[Specially reported by Messrs. GOSLINE & BARBOUR.]

Ton of 2,000 lb.

Straitsville lump	$2 65	Massillon lump	2 85
" nut	2 20	" nut	2 40
Shawnee lump	2 65	Willow Bank lump	2 85
" nut	2 20	" nut	2 40
Hocking Valley lump	2 65	Cumberland	5 40
" nut	2 20	Blossburg	5 40

Prices of hard coals on cars at Toledo are as follows:

Ton of 2,000 lb.

	Grate.	Egg.	Chestnut.	Stove
Pittston	$5 70	$5 70	$5 85	$5 95
Wilkes-Barre	5 70	5 70	5 85	5 95
Lackawanna	5 70	5 70	5 85	5 95
Lehigh	5 75	6 15	6 30	6 40

Freights.

Per ton of 2,240 lb.

Representing the latest actual charters to May 2, 1878.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	1.14†@1.25	....	....
Albany	....	....	....
Alexandria, Va	....	....	....
Brooklyn, N. Y	....	....	....
Bangor, Me	....	$1.50	....
Bath, Me	1.10	1.30	90
Baltimore	40	....	....
Boston, Mass	1.10@1.20§	1.25@1.30	80@90
Bridgeport, Conn.	....	1.30	50
Bristol, R. I	....	....	80
Beverly, Mass	....	....	80@90
Cambridge, Mass.	....	....	80@90
Cambr'g p't, Mass	....	....	....
Danversport	1.20†	....	....
Fredericksbrg, Va	....	....	....
Fall River	....	1.30	70
Gardner, Me	1.10	....	....
Gloucester	....	....	....
Georgetown, D.C.	55	....	....
Hartford, Conn.	1.35†	1.30	....
Hoboken	....	....	35
Hudson, N. Y	....	....	....
Jersey City	....	....	35
Middletown	1.30†	....	90
Nantucket, Mass.	....	....	90
Newark, N. J	....	....	....
New Bedford	....	1.30	80
Newburyport	....	1.35	1.00
New Haven	1.05	1.30	50
New London	....	1.30	50
Newport	....	....	70
New York	80@95†	1.25	35
New Orleans, La.	....	....	....
Norfolk, Va	....	....	....
Norwich	1.15‡	....	65
Norwalk, Conn	....	....	55
Philadelphia	....	....	....
Plymouth	1.30†	....	....
Portland	....	1.30	80
Portsmouth, N.H.	1.20	1.25@1.30	90
Providence	1.10	1.30	70
Quincy Point	1.35	....	....
Rockport	1.35	....	....
Richmond, Va	50	....	....
Salem, Mass	....	1.25@1.30	06@08
Savannah, Ga	....	....	....
Somerset, Mass	....	....	75
Staten Island	96	....	....
St. Johns, N. F	1.10	....	....
S'th Boston, Mass	1.10	....	....
Trenton, N. J	....	....	....
Troy, N. Y	....	....	....
Wareham	....	....	....
Washington	....	....	....
Wilmington, N.C.	....	....	....
Wilmington, Del.	....	....	....

*And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Lake Freights on Coal and Iron Ore.

Representing the latest actual charters up to the 7th inst.

From	To	Rate per ton.	From	To	Rate per ton.
Cleveland	Chicago	‖40	Blk. River	Chicago	40
"	Buffalo	40	Buffalo	"	30
"	Toronto*	1.00	"	Detroit	20
"	Milwaukee	40	"	Milwaukee	30
"	Detour	40	Ashtabula	"	40
"	Sh'boyg'n.	45	"	Chicago	40
Marquette	Cleveland†	1.40	Buffalo	Detroit§	25
"	Ashtab'la†	1.40	Oswego	Chicago	65
Black Riv.	Buffalo	35	"	Milwaukee	60
Fairport	Milwaukee	35	"	Detroit	40
Black Riv.	Br'ckville‡	1.25	Charlotte	Milwaukee	65
"	Blk. Rock.	45			

* Gold. † Iron ore. ‡ Six trips coal and six trips ore. § Pig iron. ‖ Freights are steady at these rates.

Friday, May 3, 1878.—The opening rate on coal from Os-

wego and thereabouts to Chicago is 65c. This is about equal to 25c. from Buffalo. A moderate figure from Oswego to Chicago would be $1.25.

The Cleveland *Herald* of the 4th inst. says: "Coal is not very plenty for Lake Michigan ports; vessels are not inclined to charter, as a general thing, at 35c., and when the fleet at present loading is out of the way, no doubt 40c. will be paid, as 35c. hardly pays expenses and time. BUFFALO, May 7.

Coal freights stronger and 5c. higher.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 10, 1878.

American Pig.—A more unsatisfactory condition of business has not existed since the panic of 1873. The sales amount to but a few hundred tons here and there, and prices are exceedingly weak. Most of the Lehigh furnaces are asking $18.50 per ton for No. 1 foundry, but taking in many cases $18; while we have heard for several weeks of a good brand of Lehigh iron selling at $17 at Amboy. The Lehigh companies are disinclined to sell at prevailing rates, but the Hudson River companies are said to be selling ahead at $17 for No. 1 foundry, and $16 for No. 2 foundry. The iron trade of the East appears to be in a worse condition than in many other portions of the country, its excessive productive capacity being the cause. We quote No. 1 foundry at $17@$18.50; No. 2 foundry, $16@$17.50; and forge, $15.50@$16.50.

Scotch Pig.—The sales of this article continue to be in a retail way, mostly for local consumption. During the week there are reported sales, on private terms, as follows: 100 tons Carnbroe, 100 tons Eglinton, and 50 tons Coltness. We quote Eglinton at $22.50; Coltness, $24.50, and Glengarnock, $23.50.

According to the circular of Messrs. John E. Swan & Brothers, of Glasgow, dated April 26th, the stock of pig-iron in Connal & Co.'s stores had reached 171,282 tons, as against 128,610 tons at the corresponding time in 1877. The number of furnaces blowing was 92, a decrease of 21 compared with the like time of last year. The shipments from December 25th show a falling off of 7457 tons as compared with the corresponding period of last year. The imports of Middlesbrough pig-iron show an increase of 1347 tons this year, as compared with 1877. The following were the quotations of No. 1 iron: Gartsherrie, 58s.; Coltness, 62s.; Summerlee, 57s.; Langloan, 59s.; Glengarnock. 56s. 6d.; Eglinton, 51s. 6d.

Rails.—There is no business reported, although there is yet a large inquiry for steel rails. The large business that has already been done in these and that in prospective for the balance of the year is an encouraging feature. We quote steel rails at mills at $43@$46, and iron rails at $33@36.

Old Rails.—In these there is a sale of 1000 tons reported at $18.

Wrought Scrap.—There is in all reported to have been 600 tons sold, 300 of which was at $20 per ton, the lowest price that has been reported for years. We quote at $21@22.

Baltimore, Md. May 6, 1878.

[Specially reported by Messrs. R. C. HOFFMAN & Co.]

The iron market remains unchanged; trade dull and prices about as follows:

Balt. Char.	$28.00@$29.00	M. & White	$14.00@$15.00
Va. "	27.00@ 29.00	C'lC.B.Blooms	50.00@ 55.00
Anth.No.1	19.00@ 21.00	" " Billetts	55.00@ 57.00
" " 2	18.00@ 19.00	Refi'd Blooms	45.00@ 50.00
" " 3	17.00@ 18.00		

Buffalo. May 6, 1878.

[Specially reported by Messrs. PALEN & BURNS.]

No. 1 Foundry	$19.50
No. 2 "	18.50
B 1 "	19.00
Silver Gray	17.00
American Scotch A 1	19.50
" " B 1	19.00
" " No. 2	18.50

Cincinnati, O. May 7, 1878.

[Specially reported by Messrs. TRABER & AUBERY, Commission Merchants for the sale of pig iron. blooms, ore, etc.]

Below please find closing quotations of our pig iron market, viz.:

CHARCOAL.

H'n'g Rock	No. 1 Foundry & B 1	$21 00@$22 50	—4 mos.
"	No. 2 "	20 00@ 21 00	—4 mos.
"	Soft Silver Gray	19 00@ 20 00	—4 mos.
"	Mill	18 00@ 19 00	—4 mos.
Tennessee	No. 1 Foundry	21 00@	—4 mos.
"	No. 2 "	20 00@	—4 mos.
"	Mill	18 00@ 19 00	—4 mos.

STONE COAL.

Ohio	No. 1 Foundry	$19 00@	—4 mos.
"	No. 2 "	18 00@	—4 mos.
"	Nos. 3 and 4 "	17 00@ 16 00	—4 mos.
"	Mill	17 00@	—4 mos.

COKE.

Ohio & W. Va.	No. 1 Foundry	$19 00@	—4 mos.
" "	No. 2 "	18 00@	—4 mos.
" "	Mill	17 00@ 18 00	—4 mos.

CAR-WHEEL.

H'n'g R., C. B	Hecla, Vesuvius, Etna, Jefferson.	$36 00@	—4 mos.
Maryland,	"Cedar Point	35 00@	—4 mos.
Missouri,	"Maramec	30 00@	—4 mos.
Alabama,	"Woodstock	32 00@	—4 mos.

BLOOMS.

Charcoal	$45 00@$50 00	—cash.

SCRAP IRON.

Cast	40c. @ 45c.	—cash.
Wrought	62½c.@ $1.00	—cash

Columbus, Ohio. May 6, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, Dealers in Pig Iron and Ores.]

FOUNDRY IRONS.

No. 1 Hanging Rock Charcoal	$23 50@$24 00
No. 2 " " "	22 00@ 22 50
No. 1 Hocking Valley soft and strong from pure limestone ores	20 00@ 20 50
No. 2 Hocking Valley soft and strong from pure limestone ores	19 00@ 19 50
No. 1 American Scotch	19 00@ 19 50
No. 1 Moxahala	20 00@ 20 50
No. 2 "	19 00@ 19 50
No. 1 Shawnee	19 50@ 20 00
No. 1 Eliza (Jacksonn County)	19 00@ 19 50
Silver Gray	17 50@ 18 00

MILL IRONS.

Gray neutral	18 00@ 18 50
Mottled and white neutral	17 00@ 17 50
Gray cold short	17 00@ 17 50
Mottled and white cold short	16 00@ 16 50

Chattanooga, Tenn. May 6, 1878.

[Specially reported by J. F. JAMES, Dealer in Iron & Metals.]

Tenn., Ala. & Ga. Charcoal, No. 1 Foundry	$18 00@$19 00
Tenn., Ala. & Ga. Charcoal, No. 2 Foundry	17 00@ 18 00
Tenn., Ala. & Ga. Charcoal, Gray Forge	15 00@ 16 00
Tenn., Ala. & Ga. Coke, No. 1 Foundry	19 00@ 20 00
Tenn., Ala. & Ga. Coke, No. 2 Foundry	17 00@ 18 00
Tenn., Ala. & Ga. Coke, Gray Forge	15 00@ 16 00
Tenn., Ala, & Ga. cld B. (car-wheel)	20 00@ 28 00
Charcoal or Coke, white and mottled	14 00@ 15 00

Old rails	$18 00@$19 00	Wr'ght scrap,	
Old car wh'ls.	16 00@ 17 00	No. 2	$12 00
Wr'ght scrap,		Cast scrap	10 00
No. 1	17 00	Muck bar	32 00@ 33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	$1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cleveland, O. May 6, 1878.

[Specially reported by Messrs. C. E. BINGHAM & Co.]

Per gross ton, on four months' time. Subject to change without notice.

FOUNDRY IRON.

No. 1	L. S. Charcoal	$24 00	Am. S., No. 1, Ch. Val. $22 00
No. 2	"	24 00	" " B—1, " " " 21 00
No. 1	Anthracite	21 00	" " No. 2 " " " 19 00
No. 2	"	19 00	No. 1, Massillon 22 00
No. 1	Bituminous	21 00	B—1, " 21 00
No. 2	"	19 00	No. 2, " 20 00

CAR-WHEEL AND MALLEABLE IRON.

No. 3, L. S. Charcoal	$25 00	Nos. 5 & 6, L. S. Char.	$25 00
No 4, " "	25 00		

BESSEMER IRON.

Nos. 1 & 2, L. S. Char	$24 00

FORGE IRON.

No. 1, Gray	$18 00	White and Mottled	$17 00

Louisville, Ky. May 7, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

The market continues with a good demond, but at low price. We revise quotations as below. The usual time, four months, is allowed on quotations.

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal	$21 00@$22 00	$18 00@$20 00
Southern Charcoal	18 50@ 19 00	17 50@ 18 00
H'n'g Rock, Stc'l & Coke	19 00@ 20 00	18 00@ 19 00
Southern Stonecoal & Coke	18 00@ 19 00	17 50@ 18 00

"Amer. Scotch"... $19@$20 | Silver Gray... $16@$17.50

MILL IRONS.

No. 1 Charcoal, Cold-short & Neutral	$16 00@$17 00
No. 1 Stc'l & Coke, Cold-short & Neutral	16 00@ 16 50
No. 2 Stc'l & Coke, Cold-short & Neutral	@ 16 00
No. 1 Missouri and Indiana, Red-short	20 00@ 21 00
White & Mottled, Cold-short & Neutral	14 00@ 15 00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold Blast	$32 00@$34 00
Alabama and Georgia, Cold Blast	25 00@ 31 00
Kentucky, Cold Blast	25 00@ 31 00

Milwaukee, Wis. May 7, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

CHARCOAL IRON.

No. 1 Lake Superior per gross ton	$23 00—4 mos.	
" 2 " " " "	22 00—4 mos.	

ANTHRACITE IRON.

No. 1 Anthracite per gross ton	24 00—4 mos.	
" 2 " " " "	23 00—4 mos.	

STONE COAL AND COKE.

Warner's Am Sc'th (Bk. Band, per ton	$25 00@	—4 mos.
Soft Silvery per ton	22 00@23 00	—4 mos.
Ohio Stone Coal	22 00@23 00	—4 mos.

CAR WHEEL.

Lake Superior ores per ton	$25 00@27 00—4 mos

Pittsburg, Pa. May 7, 1878.

[Specially reported by A. H. CHILDS.]

No change since last report. The supply of most kinds of iron is greater than is wanted for immediate consumption, and there is considerable competition among sellers for the few orders that are being placed. Prices, however, seem to be as low as any are willing to go, and there is at present very little cutting of rates to effect sales.

	4 mos.		4 mos.
No. 1 F'dry	$20.00@$22.00	M. & White	$15.00@$16.00
No. 2 "	18.00@ 19.50	Hot Blast Ch.	20.00@ 25.00
Gray Forge	17.00@ 19.00	Cold Blast W.	@ 35.00

Richmond, Va. May 7, 1878.

[Specially reported by ASA SNYDER, Esq.]

Amer. Scotch Pig Iron			$23.00@$24.00
" "	" "	No. 2	18.50@ 19.50
Anthracite	" "	No. 1	19.50@ 20.50
"	" "	No. 3	17.50@ 18.50
"	" "	Mottled	15.00@ 16.00
Coke	"	No. 1	21.00@
"	" "	No. 2	20.00@
Va. Cold Blast Charcoal Pig Iron, cold short			20.00@ 24.00
" " "	" "	" neutral	28.00@ 29.00
" Warm	" "	" cold short	19.00@ 22.00
" "	" "	" red short silver grey	18.00@ 19.00
Old Rails			16.00@ 17.00
Wrought scrap No. 1			18.00@ 19.00
Cast scrap—Machinery			17.00@
Richmond Refined Bar Iron			2.00@ 2.25
Horse-shoes			4.50@ 4.75
Mule-shoes			5.75@
Old Dominion nails (standard size)			2.60 keg.

St. Louis, Mo. May 1, 1878.

[Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.]

We have no change to note in regard to the condition of our market since last report Demand is fair and prices firm at quotations.

COLD BLAST CHARCOAL—ALL NUMBERS.

Hanging Rock	$25@$34	Assorted Bar Iron	$2, rates.
Tennessee	26@ 30	No. 1 Wr'ght Scarp,	60c. cw.
Kentucky	25@ 30	Heavy cast "	65c. "
Missouri	26@ 28	Light " "	55c. "
Georgia	24@ 26	Old rails	$20 00@$20 50
Alabama	24@ 26	Old carwheels	17 00@ 18 00

	No. 1.	No. 2.	Mill.	White and Mottl'd
Missouri stone coal	$22 00	$22 00	$19 00	$16 00
" charcoal	20 00	19 00	18 50	17 00
Tennessee charcoal	22 00	21 00	19 00	17 00
Tenn. coke very soft and strong	21 00	20 00	19 00	17 50
Hanging Rock charcoal	25 00	24 00		
" " cold short	22 00	21 00		
	ExNo.1	No. 1.	BNo.1.	No. 2.
Alice Hanging Rock coke.	$24 00	$23 00	$22 50	$21955
Quinnimount, W.Va., coke.	24 00	22 50	21 50	20 0

METALS.

NEW YORK, Friday Evening, May 10, 1878.

The past week has been an exceedingly quiet one, with no feature but weak prices in all articles.

RECEIPTS OF METALS AT NEW YORK FOR THE FOUR WEEKS ENDING MAY 9, AND YEAR FROM JANUARY 1, 1878.

	Apr. 18	Apr. 25.	May 2	May 9	Yr. from Jan. 1.
Copper, bbls	270	75	80	125	4,069
Copper, boxes	113	.....	.....	.....	113
Copper, cakes	.....	160	.....	.....	3,271
Lead, pigs	15,364	11,233	2,524	3,689	136,031
Spelter, pieces	912	1,022	.....	2,680	21,116
Quicksil'r, flasks	210	.....	.....	.....	310

Gold Coin.—During the week under review, the price of gold has ranged from 100⅜ to 100½, and closed at 100½.

Bullion.—The silver market has declined further in London on lower rates for the exchange sold by the Indian Council on Wednesday and the almost total cessation of shipments of silver to India. When it is remembered that India and China took over one hundred millions of dollars of silver last year, and that for about two months past not over $500,000 has been sent there, and that our Government is now out of the foreign market, as it is likely to be for some months, also out of our own market, it will be considered that the prospect for any advance in the silver market is not to be expected, but rather a further decline, unless some new market and demand should be found. The quotations are, in this city, 117¼@117½; in London, 53½d.; in San Francisco, 9 per cent discount. Gold bars are quoted at ⅛ per cent premium.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents.
May 4	53⅝	117½	May 8.	53½	117⅛
May 6	53⅝	117½	May 9.	53½	117
May 7	53 9-16	117⅜	May 10.	53½	117

BULLION SHIPMENTS.

April 26.	Tybo, Cons.	Nevada	19,545.41
" 27.	Northern Belle,	"	9,343.50
" 27.	California,	"	260,511.25
" 27.	Con. Virginia,	"	237,263.56
" 27.	Justice,	"	10,997.52
" 29.	Manhattan,	"	32,400.00
" 30.	Grand Prize,	"	17,800.00
May 1,	Hussey,	"	3,900.00
April 26.	Standard,	California	18,309.46
" 30.	Christy,	Utah	13,268.00

The following is the gross yield of the proceeds of the

mines of Lincoln County, Nevada, for the quarter ending March 31st, 1878, taken from the Pioche *Record:*

	Gross yield.
Alps	$363.21
Bonanza	442.46
Blue Bell	2,400.00
Desdemona	961.23
Day	51,735.42
Mazeppa	20,408.90
Meadow Valley	16,690.32
Newark	1,205.93
Nevada	2,380.06
Pioche	764.00
Raymond & Ely, ore	3,114.43
Raymond & Ely, tailings	28,464.62
Sunbeam	923.86
Washington & Creole	4,823.96
Total	$143,678.16

Gilpin County Bullion Shipment.—April's bullion shipment from Gilpin County embraced $93,900 in quartz mill gold, $45,000 in smelting works gold, and $129,683 in smelting works silver. There was also about $10,000 worth of ore sent to Golden. Total export for the month, $278,583. Over three fourths of the silver came from ore of other counties.

The Monthly Bullion yield of Arizona is estimated to be $300,000, which is liable to be doubled within the next six months.

SILVER PAYMENTS BY GOVERNMENT.

WASHINGTON, May 4.

The following is a memorandum of silver payments, etc., as reported from offices so far as received to April 30th, 1878:

TREASURY OF THE UNITED STATES, May 1, 1878.

Fractional silver on hand	$5,414,112.00
Fractional currency received as silver on hand	750,369.00
Standard silver dollars on hand	289,993,257.00
Fractional silver issued for fractional currency redeemed and destroyed	24,703,322.96
In payment of currency obligations	14,096,699.82
For fractional currency redeemed and undestroyed	209,017.22
Total	$39,099,040.00
Standard silver dollars issued for currency obligations and United States notes	$12,143.00
For silver bullion	99,169.43
For gold coin	215,598.00
Total	$326,910.43
Silver certificates outstanding	63,000.00
Fractional currency	16,805,414.52

The Specie Exports from New York for the week ending May 4th, amounted to $465,300.

Copper.—The demand has been exceedingly quiet, the large sales made a week ago having had a depressing effect, leaving, as it is supposed, an insufficient market for the outside lots of copper that are constantly coming forward. We quote at 16¼@16½c., although prices, in the absence of business, are quite nominal. London quotations by latest cable advices were: Best selected, £69 10s., and Chili bars, £62. New supplies of copper are expected the latter part of next week.

Tin.—There is only a jobbing business doing. Straits in London is quoted to-day at £60 10s.; at Singapore, $18.20; and Penang, $17.70, with exchange at 4s. 5⅜d. In this market 14¼c. is asked and 14⅛c. bid. L. and F. is quoted at 14⅛c., with one lot offered at 14c.

Tin Plates have been very quiet and weak, with a strengthening tendency at the close, owing to more confidence being placed in the combination formed in England to limit the production, and to the fact that prices in some instances in this market are below the cost of importing. During the last three or four years we have had numerous combinations and rumors of combinations among the tin plate makers in England; but, as they have never amounted to much, very little credence is given to the proposed one. We quote, in gold, per box, as follows: Charcoal tins, $5.25, and ternes, $5.37½; coke tins and ternes, $4.87½@$5.

Messrs. Robert Crooks & Co., of Liverpool, under date of April 25th, say of tin and terne plates:

"Makers are still full of the idea of reduced make, and already there is quite a feeling of hopefulness that prices will improve; indeed, now it is hard to buy at our quotations of last week. The position of proposed reduction is, that it will be carried out if 165 mills give their assent. As 144 have already consented, it now only remains for the necessary 21 to come into the arrangement, and the production will be lessened by one third. General quotations are: Charcoal tins, 17s. 9d. to 19s. for half-cross; cokes, 15s. 3d. to 15s. 6d.; charcoal ternes, 16s. 9d. to 17s.; coke ternes, 14s. 3d. to 14s. 6d."

Lead.—500 tons to arrive in June are reported to have been made at 3½c., which is the price at present, although a thousand tons could not be sold at any thing like that figure.

Spelter and Zinc.—The same dullness that has characterized these for some time continues. The former is quoted at 5¼c., and the latter at 6@6⅛c.

Antimony, with but little business, is quoted at 12@12⅛c. for Hallett's, and 12¾@12½c. for Cooksons.

Quicksilver.—The San Francisco *Commercial Herald* of May 2d, says: "There promises to be a decided falling off in receipts this year as compared with those of the two preceding years. Long-continued low prices have had the effect to shut up several small mines, while others long in the field are said to be producing less than the average by reason of impoverished ores. The sales for export during the week have been at 41½@42c. The receipts thus far during the year show a large falling-off as compared with the same period of last year—four months—being something like 8500 flasks deficiency. This, be it remembered, is not the entire production of the State, but simply the receipts at this port, not a little going to the mines direct, and not reported here statistically until the close of the year. The City of Tokio, for Hong Kong, will carry upward of 1000 flasks. Holders at the close are asking 42½c.; 42c. bid.

Salt Lake Ore and Metal Market.

SALT LAKE CITY, Utah, May 10, 1878.

Argentiferous Lead (Base Bullion). $35 per ton for lead; $1.18 per ounce for silver; $20 per ounce for gold. The quotations for silver are based upon the silver in the lead of 80 to 120 ounces per ton of 2000 lbs.

Mr. J. B. Meader, under date of the 4th inst., reports the following bullion shipments:

	Lbs.
Shipments of base bullion for April, 1878	20,631,844
Shipments of lead (Germania refined)	188,503
	2,820,347
Shipments of base bullion for three months	11,778,288
	14,598,635
Ore shipments for April reduced to lead	470,735
Ore shipments for three months	252,487
	723,222
Total shipments of lead for four months, 1878	5,321,857
Same time for 1877	19,874,397
Decrease in 1878	4,552,540

We note the statement that our purchasers from Utah have been very active recently in the Eureka, Nevada, district. About 300 tons of high grade ore have been shipped to Salt Lake during two weeks ending April 21st.

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, May 10, 1878.

The market for coal shares during the past week has been comparatively steady, and, with a single exception, these is no change worthy of comment. The total transactions aggregate about 85,000 shares; Delaware & Hudson Canal stock closes at 54½, with sales of 5084 shares. 73,260 shares of Delaware, Lackawanna & Western stock have changed hands at from 54⅝ to 52½, closing at 53¼. The favorable progress of the reorganization scheme of the New Jersey Central R. R., imparts a better feeling in this stock, the transactions to-day have been made at enhanced rates, closing at 19 against 17⅛ a week ago.

Shenandoah Valley R. R. Co.—At the annual meeting in Winchester, Va., May 1st, the board reported that a contract had been concluded with John Satterlee & Co., of New York, to build the road from the Potomac River at Shepherdstown, W. Va., south by west to the Chesapeake & Ohio, at Waynesborough, Va., with the branch to Martinsburg. The whole length of road to be built is about 125 miles, and the work is to be done in three years.

The road was projected as a line up the Shenandoah Valley, and has been always considered as in the interest of the Pennsylvania Railroad Company. The route is parallel to and generally east of the Valley Branch of the Baltimore & Ohio and the Valley Railroad. Part of it was graded six years ago, but no work has been done for several years.

Stockton & Bodie R. R.—It is proposed to build a narrow-gauge road from Stockton, Cal., eastward about 120 miles, to Bodie, in Mono County, the center of a rich mining region. There is said to be a practicable route over the mountains by way of Sonora and the Mono Pass.

AUCTION SALES.—*Morris & Essex R. R. Co.*—$3000 first mortgage 7 per cent bonds, due 1914, at 116 per cent.

New Jersey Zinc Co.—26 shares common stock at $51 per share, and 6 shares preferred at $56.

Blue Ridge Clay Co., of St. Louis.—92 shares at $50 for lot.

Cumberland Coal & Iron Co.—$7000 second mortgage 6 per cent bonds, due February, 1879, at 94¼ per cent.

Pennsylvania Coal Co.—An election for Directors of this Company will be held June 11.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, May 10, 1878.

The marked feature in our report is the decline in the stock of the Lehigh Valley R. R. Co., the quotations being two points below the closing prices a week ago. The sales amount to 2491 shares. Pennsylvania R. R. stock is also lower, closing at 27⅝, against 28¼ a week ago; the sales aggregate 26,781 shares. Lehigh Coal & Navigation Co. stock is weak, with sales of 1250 shares. Reading is steady. Sales amount to 12,638 shares.

Enterprise of the Keystone Coal Co.—We note the statement that the Keystone Coal Company propose extending its narrow-gauge railroad from Keystone Junction—two miles west of Sand Patch tunnel on the line of the Pittsburg & Connellsville Railroad—along Flaugherty creek and across Savage Mountain to connect with the Cumberland & Pennsylvania Railroad at or near Mount Savage Junction.

The road is now about five and a half miles in length, extending from Keystone Junction to the mines. By building six or eight miles of railroad they reduce the distance to Cumberland from 35 to 26 miles. The track will be laid with 52-pound steel rails. The shortness in the distance is not, however, the only advantage. The company is now forced to ship its coal via the Pittsburg & Connellsville Railroad, the charges upon which for coal to be shipped to the canal are so exorbitant that the company can not avail themselves of the advantages of the water-course. By making the proposed connection they can ship at their option either by canal or railroad. The building and completion of the railroad is a matter of the near future.

AUCTION SALES.—*American Dredging Co.*—58 shares at $7 per share.

Minehill & Schuylkill Haven R. R.—30 shares at $47¼ per share.

Westmoreland Coal Co.—111 shares at $65@$64¾ per share.

Lehigh Navigation Co.—$3000 Conv. Gold 6 per cent bonds at 96 per cent.

Reading R. R.—$1000 new Conv. 7 per cent bonds at 26 per cent; $1000 new Conv. 7 per cent bonds, new debenture, 6s, at 38 per cent.

Pickering Valley R. R.—$3000 1st Mort. 7 per cent. bonds, guaranteed by Reading R. R., at 50 per cent.

Pennsylvania Canal Co.—$1000 of the 6 per cent bonds at 59.

The Cattawissa R. R. Co. announces a dividend of 3½ per cent. on its preferred stock, payable May 14th.

The following companies have their dividend periods during the month:

Elmira & Williamsport.
Pennsylvania R. R. Co.
Lehigh Navigation Co. (quarterly).
Buck Mountain Coal Co.

Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 10th inst are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

STOCKS.	Par Value.	High'st	Lowest	Closing	Sales: Shares.
American Coal Co.	$25	.....	.....	30	200
St.L.,I.M.& S.R.Co..	100	7½	7½	7	225
Spring Mt. Coal Co.	50	.....	.....	35	.....
*Cambria Iron Co..	50	.....	.....	53½	.....
*Penn. Salt Mf'g Co.	50	.....	.....	60	.....
*Westm'land C. Co.	50	.....	.....	64	.....
*Buck Mt. Coal Co..	50	.....	.....	33	.....
*Schuyl. Nav. Co...	50	.....	.....	.....	.....
†B.&O.RR.Co.1st pf	.....	.....	.....	96	.....
†B.&O.RR.Co.2d pf	100	.....	.....	83	3
" " " com	100	78	76¼	76	45
†George's C'k C. Co	100	.....	.....	85	.....
†S. Clara M'g Co...	100	.....	.....	25c.	.....
†Atlantic Coal Co.	10	.....	.....	91c.	.....

BONDS.	Princ'l. When Due.	Int'est. When Due.	Hig'st.	Lowest	Amount.
D., L. & W., 7s, conv	1892	J. & D.	.....	.....	.....
" " " 2d mtge.	1881	M. & S.	104½	104½	$13,000
N.J.C.,1stmtge.new	1890	F. & A.	111¾	111½	21,000
" " " 1st mtge.,con	1899	Q.	73½	70⅞	55,000
" " " convt.....	1902	M. & N.	76	70⅞	41,000
Lehigh & W. B., con	1899	Q.	43	40	89,000
Am. Dock & Imp. 7s	.....	J. & J.	45	44	11,000
St.L.I.M.& S..1st mt	1892	F. & A.	.....	.....	.....
Ches. & O., 1st mtge	1899	M. & N.	25	24½	1,500
D & H C Co.,1stm.rg	1884	J. & J.	100	99½	23,000
" " " " "	1891	J. & J.	100½	99½	14,000
" " " " m.loan cp	1894	A. & O.	97	96¾	14,000
" " " " " rg.	1894	A. & O.	.....	.....	.....
" " " " " new mge.	.....	.....	.....	.....	.....
*L.V.R.,1stm.6s.cp.	1898	J. & D.	110	.....	2,000
" " " " rg.	1898	J. & D.	112	.....	1,000
" " " 2d m. 7s,rg.	1910	M. & S.	113½	.....	4,000
" " " con.m.6s,rg	1823	J. & D.	97¾	97½	16,000
" " " " 6s cp.	1923	J. & D.	97¼	.....	1,000
*Pa.RR.,1st m.6s,cp	1880	J. & J.	104¾	.....	16,000
" " g. m., 6s, cp.	1910	J. & J.	107	....	1,000
" " " 6s, rg.	1910	A. & O.	.....	.....	.....
" " con.m.6s,rg.	1905	Q.	91½	.....	1,000
" " " 6s, cp.	1905	J. & D.	.....	.....	.....
" " new loan, 5s	.....	.....	110¾	110½	9,000
*P.& R. R., 1st m. 6s, R. C. 43-44.....	1880	J. & J.	103¾	.....	1,000
P. & R. R., 1st m. 6s, R. C. 48-49.....	1880	J. & J	.....	.....	.....
P.& R. R.,2d m.7s cp	1893	A. & O.	110½	110	5,000
" " " scrip....	1882	J. & J.	53	.....	3,120
" " " in.m.7s,cp	1896	J. & D.	.....	.....	.....
" " " c.m.7s,cp.	1911	J. & D.	100	99¾	10,000
" " " 7s, rg.	1911	J. & D.	100	.....	7,000
" " " cvt.7s,R.C	1893	J. & J.	.....	.....	.....
" " C.& I.Co.,Deb 7s, R. C.....	1892	M. & S.	.....	....	.....
& R.C.& I. Co., m. 7s, R. C.....	'92-3	various	.....	.....	.....
L. Nav. Co.,6s,rg.m.	1884	J. & O.	103¼	103	5,200
" " RR., rg. m.	1897	F. & Q.	103	. . .	3,500
" " cvt. co. G. R.	1894	M. & S.	.....	.....	.....
" " " Gold R. C.	1897	J. & D.	.....	.....	.....
" " con.m.7s,rg.	1911	J. & D.	.....	.....	.....
*P.& N.Y.C.,7s,R.C.	1896 / 1906	J. & D.	113	.....	1,000
*Pa Canal, 6s. cp..	1910	J. & J.	60	.....	1,000
*Schuyl.Nav.,1st m. 6s. rg.....	1897	M. & O.	.....	.....	.....
*Sus. Coal, 6s, rg...	1911	J. & J.	.....	.....	.....
†Balt.&O. RR., 6s..	1880	J. & J.	.....	.....	.....
" " " " 6s..	1885	A. & O.	104½	104	4,000
Total transactions for the week					$374,320

† Ex-Coup.

Copper Stocks.

Reported by WILSON W. FAY & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street

BOSTON, Wednesday Evening, May 8, 1878.

The condition of the market has slightly improved during the week, although the prices of most of the stocks, with the exception of Calumet and Hecla, have declined. Nevertheless the number of transactions have been greater and have been distributed more among the stocks than usual, which denotes a returning interest and an evident disposition to trade, which, if continued, will be likely to cause a reaction.

It is reported that there has been a foreign shipment of 7,400,000 lbs. of copper at ¾ cent advance, which should also have a beneficial effect upon the copper stocks.

Calumet and Hecla has advanced to 177 bid and 178 asked, and closes firm.

Central is offered at 32, and no bid ders.
Copper Falls is quiet, there being no transactions at any thing over $1, and closes $1 bid and $1.50 asked.
Franklin remains about the same—6½@7.
Osceola is also quiet, and weak at $8@$10.
Pewabic remains firm at 1¾@2, and little stock on the market.
Quincy declined to 15, in consequence of the sale of 420 shares of stock, and closes rather soft at 15@15¼.
Ridge sold down to 1¼, and is also weak at 1@1.50.
Duncan has fluctuated pretty freely and sold at 1 5-16, 1⅜ and 1½, but has declined again and closes 1¼@1½.
International is firm at 25@35, and sales at 30.

Gas Stocks.

NEW YORK, Friday Evening, May 10, 1878.

Gas stocks continue dull and prices tend lower. The stocks of the New York Gas Co., the Manhattan Gas Co. and the Brooklyn Gas Co. have each declined $5 per share, otherwise our list is unchanged.

The Coney Island Gas Co.—This company was organized in December, 1877, for the purpose of supplying gas to this popular summer resort. The company propose laying its pipes to the towns of Gravesend and Parkville during the coming season, and they will undoubtedly have a very satisfactory patronage, as gas was very much needed.

Montreal Gas Co.—We note recent sales of forty shares of the stock of this company, at from $147 to $148 per share.

The Pittston (Pa.) Gas Co. has declared a dividend of 5 per cent, payable on the 20th inst.

California Gas Stocks.—The *Commercial Herald* reports transactions in California gas stocks as follows: 350 shares S. F. Gaslight at 101¾; 200 shares Oakland gas at 41; 100 shares Los Angeles at 40.

Milwaukee Gas Lamps are to be lighted this year at $15.75 per lamp.

The Consolidated Gas Co., of Pittsburg, Pa.—The report of the Secretary of the Consolidated Gas Company read at the annual meeting on the 6th inst. shows, that during the past year there has been laid in all 12,884 feet, or two and a half miles of pipe, at a cost of $12,869.50, less $1,400 for pipe on hand, making a net cost of mains laid of $10,969.54. In a statement accompanying the report the consumption for the four months beginning July 1, 1877, shows a falling off of 771,600 feet over the corresponding period of the previous year. This is in a very great measure due to the riots of July, when the company lost the entire consumption of the Pennsylvania Railroad, besides many other very large consumers from the same cause, all of whom have long since been recovered. The total amount of gas made during the year was 80,625,700 feet.

AUCTION SALES.—*Williamsburg Gas Light Co.*, 29 shares at $102½ per share, and $1450 scrip bonds at 100 per cent.
Manhattan Gas Light Co.—50 shares at $198 per share.
Duplex Gas Saving & Enriching Co.—330 shares at $50 for lot.
Northern Liberties Gas Co.—An election for two trustees of this company will be held May 14th.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

COMPANIES IN NEW YORK AND VICINITY.	Capital Stock.	Par.	DIVIDENDS. Rate per ann.	Am. of last.	Date of last.	QUOTATIONS. Bid.	As'd
	$		P. ct.				
Mutual, N. Y.	5,000,000	$100	10	1½	Apr., '78	75	80
" Bonds	90,000	1,000	7	3½	Feb., '78	.....	102
N. York "	4,000,000	.....	10	4	May, '78	100	105
Metrop. "	2,500,000	100	10	5	Feb., '78	128	132
" Certfs	1,000,000	.....	7	3½	" '78	100	103
" Bonds	500,000	1,000	7	3½	Dec., '77	102	...
Harlem "	1,850,000	50	8	3	Feb., '78	90	95
Manhat. "	4,000,000	50	....‡	5	May '78	195	198
Brooklyn, Bkln.	2,000,000	52	15	5	Apr., '78	140	150
Nassau	1,000,000	25	....‡	3	Jan., '78	70	80
" Certfs	700,000	1,000	7	3½	May, '78	....	101
People's	1,000,000	10	....‡	3½	Jan., '77	25	30
" Certfs	300,000	1,000	7	3½	Jan., '78	80	85
" Bonds	325,000	.....	7	3	Feb., '78	96	100
Metrop. "	1,000,000	10	5	2½	Nov., '77	68	70
W'msb'g "	1,000,000	50	10	2	Apr., '78	100	105
" Certfs	1,000,000	.....	7	3½	Jan., '78	100	102
Citizens'	1,200,000	20	....‡	3	Jan., '78	75	80
" Certfs	320,000	1,000	7	3½	Apr., '78	97	100
J. C., N. J.	750,000	20	10	5	July, '77	160	....
Cen. Wstch. N.Y.	466,000	50	7	4	July, '77	70	....
Subur'n, "	295,000	50	7	3½	Oct., '77	....	95
Municipal, N. Y.	1,500,000	100	.....	.....	.....	94	97

Gold and Silver Stocks.

NEW YORK, Friday EVENING, May 10, 1878.

The past week has been a very quiet one, the officially reported sales aggregating but 164,211 shares, of which total 142,400 shares were in stocks selling at less than 50c. per share. The public is becoming better educated in mining matters, and is not inclined to be tempted by the many uncovered baits that are held before it. There is, however, a large amount of capital going into the development and purchase of mines, and a larger amount is under negotiation. There is certainly a good field for profitable investment in our gold and silver mines, if purchases be judiciously made.

The sales of American for the week aggregate but 250 shares at $6@$8; of Moose but 500 shares at $7⅝@$7; of N. Y. & Colorado, 500 shares at $1.80@$2.10. Ontario has had sales of 976 shares at $36@36½; Plumas, 6700 shares at $4.05@$3.85; American Flag, 2400 at 12@11c.; Bertha & Edith, 28,100 at 16@13c.; Buckeye, 3500 at 37@39c.; Cashier, 1400 at $1.45@$1.30; Dahlonega, 52,300 shares at 14@19c.; Gold Placer, 4400 shares at $1.40@$1.10; Kings Mt., 2100 shares at $1.65@$1.70; La Crosse, 59,600 at 45@35c. The business in the San Francisco stocks in this market has been very small. When we look at the list of sales this week and see how little business was done outside of the speculation in the low-priced stocks, and consider how much of it was "washed," we cannot but say that those in the Mining Exchange who are truly anxious to see it made a permanent institution should make a strong effort to put its business on a sound basis. Until the brokers give their customers approximately the value of their money they will do but little to advance the mining interests.

In fulfilling our duties as a reliable guide to investors, we published in our number of April 27th, a statement relative to the Moose mine, which it has been the pleasure of some to term "an attack." Although we make no claims to infallibility, yet we always believe, when making a positive statement, that we are correct. Following the publication mentioned we were confronted by the President of the Moose Mining Company, and a *lawyer*. To many of our in-town readers, however, we suppose this is not news. Our report was pronounced a "fabrication" and our informant's name was demanded of us, there being no desire to be "severe on the press." Of course we had no anxiety to announce to the world the sources from which we draw so much valuable information published each week in our columns. We were then threatened with something which we feared might be the *Tribune's* "Gedney." It then became us to put ourselves in a position to defend a claim for—we did not know how many hundreds of thousands of dollars. Of course, we have never "weakened," and are now beginning to feel that we are in an exceedingly strong position.

Following our article there is said to have come from Denver a telegram from one Moffatt, Cashier of the First National Bank, as follows: "The checks of the Moose Company on this bank have never been refused." We know nothing about the affairs of this bank; but does not the Moose Mining Company owe it between $70,000 and $100,000, most, if not all of which has been used by the mining company to pay dividends? and has not the bank an interest in maintaining the price of the Moose stock which it may have as collateral?

We are informed by parties in Denver, upon whom we are willing to depend, that they can procure us affidavits from—well, more people than we should require, under any circumstances, who have had the Moose Mining Company's checks thrown out of the First National Bank of Denver. Besides this, we do not hesitate to say that the company owed its workmen considerable money at the date of our article. Not having had a telegram from the mine today, we are unable to say whether they are paid now or not.

The object of our article was not to prove the mine worthless, but to enable our readers to judge as to whether they were not paying too much for the stock at, say $8 per share, equal to $1,600,000 for the whole mine. In our efforts to obtain reliable information, we have not had a value of more than $300,000 placed on the mine, and in giving it this figure it is placed at a value that is exceeded by but few mines in Colorado. The general impression is that this mine should pay well on a proper capitalization, if well conducted and with salaries reduced to a minimum consistent with efficient management.

Had the value of $400,000 or $500,000 been placed on the mine, we could only have considered it a difference of opinion between conservative and sanguine judges; but the actual difference is so great that we can not let it pass unnoticed.

As we have said before, this is not the only overrated mine. Prominent among these is the American. This stock closes at $8 per share, giving the mine a market value of $800,000, which is undoubtedly four times its actual value. This stock has been strengthened during the week by the announcement that the company has acquired some Black Hills mines. That many of the mines in this district are quite valuable appears to be beyond question, but the mere fact of owning property there, does not necessarily add much value to the American stock. This company appears to have taken the cue from the Gold Placer, and Buckeye companies, and expects to entrap the public by the possession of immense domains. Most of our readers are aware (or should be) that it costs but little money to become possessed of much territory in the far West.

Enough has been said of the Gold Placer and Buckeye to guard the public against investing in them at any thing like present prices, if at all. The Cashier is showing up very well, but in its present state of development does not seem to warrant the price asked for it. American Flag is nothing more than a trap for a "short" interest. Lacrosse is but little better, but has the short interest to sustain it. If the stock depended entirely upon merit, its price would have been much lower than it is long before this. Dahlonega is an untried experiment and is selling quite high for a prospect. But very little is known of Plumas, which is in an out-of-the-way place in California. The large transactions that have been made in this stock since it was entered on the list, coupled with its being but little known here, would naturally lead us to suppose that there has been considerable "washing" done in the sales.

We learn that the efforts of the San Antonio Silver Mining Co., of Nevada, to secure the necessary working capital for its mine, are meeting with fair success. We publish elsewhere in this issue the prospectus of this company.

The commission on stocks selling at less than 50c. a share was reduced to-day to 50c. per 100 shares.
The Ontario Silver Mining Company will pay dividends, 25 and 26, each of $50,000, on the 15th inst.
The Vice-President of the company furnishes the following information:
Total production for April, 90 bars of bullion, having an assay value of $168,661.28; expenses for April, $7,500, leaving a cash balance on hand, May 1st, of over $300,000.
The Superintendent, in his report for the nine days ending April 30th, says: "The stoppings throughout the mine look as well as usual. The 500-foot level is now driven 540 feet east of shaft station and holds good in ore. Raise in west of same level is up 50 feet, and holds three feet of very fine ore. The new working shaft is progressing very favorably in good working ground, and is now down 63 feet, with pump compartment 5 by 7 feet in the clear, and two hoisting compartments 4½ by 5 feet in the clear each."

SAN FRANCISCO MINING STOCK QUOTATIONS.
Daily Range of Prices for the Week.

NAME OF COMPANY	CLOSING QUOTATIONS. May 3.	May 4.	May 6.	May 7.	May 8.	May 9.	Opening. May 10.
Alpha	7¾	.....	7½	7⅝	7½	7½	7½
Belcher	2⅞	.....	2⅞	2⅞	2⅞	2¾	3
Best & Bel.	13	.....	14	14	13¼	13½	13
Bullion	3¾	.....	3⅞	3¾	3½	3½	.....
Caledonia	1¾	.....	1¾	1¾	1⅝	1½	.....
California	25¾	.....	26¼	26½	25¾	25¾	25
Chollar-Pot	27½	.....	29	28	25¾	26½	26½
Con. Imp.	.....	.....	.....	.....	.....	.....	.....
Con. Va.	14⅜	.....	14½	14¾	14⅜	14½	14
Confidence	.....	.....	.....	3½	3¼	.....	.....
Crown P'int	3⅜	.....	3⅜	3¼	3⅜	3½	3
Eureka Con	53¾	.....	59¾	59½	58½	58¼	58
Exchequer	2¼	.....	2⅛	2¼	2¼	2⅛	.....
Gould & Cur	6⅛	.....	5⅞	6¼	5¾	5¾	6
Grand Prize	3½	.....	3⅜	3⅜	3⅜	3¼	.....
Hale & Nor.	7½	.....	7⅛	7¼	6⅞	6¼	7
Julia	4⅛	.....	4⅜	4¼	3⅞	3⅜	.....
Justice	5½	.....	5⅛	4⅞	4⅞	4⅛	4
Kentuck	2⅜	.....	.....	.....	.....	.....	.....
Mexican	9	.....	9⅛	9	8½	8⅝	8½
North. Belle	5½	.....	.....	5¼	5	5¼	.....
Ophir	32	.....	32¾	32¼	30	29½	28½
Overman	9½	.....	9⅝	9⅝	9⅝	9⅞	9½
Ray. & Ely	.....	.....	3½	2¾	2	.....	2
Silver Hill	.....	.....	1¼	1¼	1¼	1⅛	.....
Savage	9⅞	.....	10	11⅛	9⅝	10	9½
Seg. Belcher	.....	.....	20	.....	20	.....	.....
Sierra Nev.	3⅞	.....	3⅞	3¾	3¾	3¼	3
Union Con.	4	.....	3⅞	3¾	3⅝	3½	3½
Yel. Jacket	5	.....	7	6¾	6¾	6½	6½

The gap between the quotations of the stock of the two principal bonanza mines continues to widen, California opening in San Francisco to-day at $25 per share and Consolidated Virginia $14, a lower price for the latter stock than since the first discovery of the bonanza. The Nevada Bank has reduced its loaning rate on this stock to $10 per share and keeps the rate on the California to the amount at which it was lately reduced, viz.: $15 per share. These companies have declared dividends at their regular periods, the California paying $2 per share, and the Consolidated Virginia reducing to $1 per share. The hopes and anticipations of all are centered upon the undiscovered bonanza which it is supposed exists in the Savage workings. This stock is fairly steady, yet the quotation to-day is at the lowest of the week.

The stock of the Eureka Consolidated Company advanced to $59¾ on the 8th inst., and opens to-day at $59. Recent information from the mine states that the ore body on the seventh level promises to develop into one of the largest deposits ever found in the mine. This company has disbursed to its shareholders, since it began the resumption of dividends in September last, $24 per share. A year ago the stock was selling for $12 per share. A recent letter from the Superintendent of the Hamburg Mine, located near the Eureka, says:

"We have uncovered a body of ore of extra good quality over twenty feet in width. The weekly assays give a value of from $85 to $114 per ton, with from 26 to 35 per cent of lead."

Silver King Mining has declared its sixth consecutive dividend of $30,000.
Assessments, with dates when delinquent:
Overman, $3, May 31st; De Frees, $1, May 27th; El Dorado South Con., 50c., May 31st; Rock Creek, 10c., May 31st; Diana, 5c., May 30th; Monitor Belmont, 50c., May 27th; Baltimore Con., 50c., Falcon Mining Co., 10c.

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

COAL STOCKS.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	SHARES. Par Val.	ASSESSMENTS. Total levi'd to date.	ASSESSMENTS. Date and amount per share of last. Mo.	Yr.	Amt.	DIVIDENDS. Total paid to date.	Last Dividend. Mo.	Yr.	Amt.	Rate per Ann.	HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. N. B.—Quotations of D., L. & W. R. R., and Pa. Coal Co. are per $100—two shares. May 4. H.	May 4. L.	May 6. H.	May 6. L.	May 7. H.	May 7. L.	May 8. H.	May 8. L.	May 9. H.	May 9. L.	May 10. H.	May 10. L.	SALES.
			$		$	$				$				Per c'nt												
Consol. Coal	Md.	.....	10,250,000	102,500	$100	*	.....	.....	.....	.....	Jan.	1877	2½	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. Canal	Pa.	.....	20,000,000	200,000	100	*	.....	.....	.....	38,821,104	Aug.	1876	4	9	53¾	53	55	52½	55	53⅞	53¾	53	53¼	53¼	54¼	53¾	5,084
Del., Lac. & W. R. R.	Pa.	.....	26,200,000	521,000	$50	*	.....	.....	.....	.....	July	1876	2½	5	53⅛	52½	54¼	52¾	54¾	53½	53½	52⅞	53¼	52½	53⅝	53	73,260
Lehigh C. & Nav.	Pa.	.....	10,448,550	208,971	50	*	.....	.....	.....	.....	Nov.	1876	1½	5½	16⅞	16⅞	16¾	16¾	16⅝	16⅝	16⅝	16½	16¼	16⅛	16⅞	16⅜	1,250
Lehigh Valley R. R.	Pa.	.....	27,042,900	540,858	50	*	.....	.....	.....	.....					37½	37⅛	37¼	37	37⅛	37	37⅛	36½	36⅜	36	35⅞	35½	2,491
Maryland Coal	Md.	.....	4,400,000	44,000	100	*	.....	.....	.....	.....	Jan.	1876	1½	1½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. J. Central R. R.	Pa.	.....	20,600,000	206,000	100	*	.....	.....	.....	.....	Apr.	1876	2½	2½	17⅛	17⅜	17⅜	17¼	18¾	18	18¾	18	18¼	17½	19	18½	6,111
Pennsylvania Coal	Pa.	.....	10,000,000	100,000	50	*	.....	.....	.....	.....	Feb.	1878	3	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania R. R.	Pa.	.....	68,870,200	1,337,404	50	*	.....	.....	.....	.....	May	1877	1½	8	28⅜	28¼	28½	28¼	28⅞	28¼	28½	27¾	27⅞	27⅜	27¾	27⅝	36,781
Phil. & Read. R. R.	Pa.	.....	34,278,175	685,563	50	*	.....	.....	.....	43,012,497	Jan.	1876	2¼+	10	13⅞	13¼	13⅝	13⅜	13⅜	13½	13¾	13¼	13¼	13	13⅜	13¼	12,638

GENERAL MINING STOCKS.

Dividend Paying Mines.

American	Col.	.....	1,000,000	100,000	10	*	.....	.....	.....	50,000	May.	1878	$0 10	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	6	8	.....	250
Belcher, g. s.	Nev.	1,040	10,400,000	104,000	100	1,280,400	Mar.	1878	1 00	15,397,200	Apr.	1876	1 00	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bobtail, g.	Col.	2,500	1,130,630	227,326	5	*	.....	.....	.....	56,831	Nov.	1877	25	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bobtail Tunnel, g.	Col.	.....	100,000	20,000	5	52,000	July	1873	0 30	40,000	Dec.	1877	50	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California, g. s.	Nev.	600	54,000,000	540,000	100	.....	.....	.....	.....	24,840,000	Mar.	1878	2 00	24	26¾	...	26¾	26	28	.....	.....	.....	.....	.....	26½	.....	60
Calumet & Hecla, c.	Mich	.....	2,000,000	80,000	25	1,000,000	.....	.....	.....	12,650,000	Feb.	1878	5 00	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central, c.	Mich	.....	500,000	20,000	25	100,000	June	1862	0 65	1,260,000	Feb.	1878	5 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cholla Potosi, g. s.	Nev.	1,400	2,800,000	28,000	100	1,578,000	Jan.	1878	3 00	3,080,000	Feb.	1877	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Copper Falls, c.	Mich	.....	1,000,000	20,000	50	535,000	May.	1876	.....	100,000	Nov.	1871	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Virginia, g. s.	Nev.	710	54,000,000	540,000	100	474,600	June	1873	3 00	38,880,000	Mar.	1878	2 00	24	15½	...	.....	.....	15½	...	15½	...	15¼	.....	.....	.....	.....	115
Confidence, g. s.	Nev.	130	2,496,000	24,960	100	243,840	Mar.	1873	1 00	78,000	May.	1865	8½	8½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Her. & Roe	Col.	16,500	1,000,000	100,000	10	*	.....	.....	.....	120,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crown Point, g. s.	Nev.	600	10,000,000	100,000	100	1,673,370	Jan.	1878	1 00	11,588,000	Jan.	1875	2 00	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Cons., g. s. l.	Nev.	.....	5,000,000	50,000	100	100,000	May	1876	1 00	1,900,000	Feb.	1878	3 00	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka G. Mg., g.	Cal.	1,680	2,000,000	20,000	100	.....	.....	.....	.....	2,134,000	Aug.	1877	2 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin, c.	Mich	.....	500,000	20,000	25	360,000	June	1876	5 00	585,000	Nov.	1871	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, g. s.	Nev.	612	10,800,000	108,000	100	2,558,000	Dec.	1877	1 00	3,826,800	Oct.	1870	10 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Prize	Nev.	.....	.....	.....	.....	.....	.....	.....	.....	1,200,000	Feb.	1878	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, g. s.	Nev.	400	11,200,000	112,000	100	2,746,000	Dec.	1877	1 00	1,598,000	Apr.	1871	5 00	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hukill, g. s.	Col.	3,288	1,000,000	100,000	10	*	.....	.....	.....	100,000	May.	1878	0 10	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentuck, g. s.	Nev.	95	3,000,000	30,000	100	270,000	Dec.	1874	1 00	1,252,000	Mar.	1870	5 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leopard, l. g. s.	Nev.	1,500	5,000,000	50,000	100	125,000	Feb.	1878	50	162,500	Dec.	1876	0 50	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Merrimac, s.	Mas.	1,500	500,000	100,000	5	*	.....	.....	.....	120,000	Mar.	1878	0 10	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minnesota, c.	Mich.	.....	1,000,000	20,000	50	436,000	June	1869	1 00	1,820,000	Mar.	1876	0 50	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose	Col.	39,000	2,000,000	200,000	10	*	.....	.....	.....	200,000	Mar.	1878	0 25	10	.....	.....	7⅜	7	.....	.....	.....	.....	.....	.....	7	.....	500
National, c.	Mich.	.....	500,000	20,000	25	195,000	Oct.	1875	1 00	360,000	Oct.	1873	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y. & Colorado, g.	Col.	.....	1,000,000	50,000	20	*	.....	.....	.....	20,000	Mar.	1877	0 20	...	2 10	...	2.00	1.95	1.80	.....	2.05	2.00	.....	.....	.....	.....	.....	500
Northern Belle, s.	Nev.	1,600	5,000,000	50,000	100	.....	.....	.....	.....	1,425,000	Feb.	1878	1 00	...	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
Ontario.	Uth.	3,000	10,000,000	100,000	100	.....	.....	.....	.....	1,200,000	Apr.	1878	1 00	6	.....	.....	36¼	.....	.....	.....	36¼	36	36¼	.....	36½	.....	976
Ophir, g. s.	Nev.	675	10,080,000	100,800	100	3,035,200	Jan.	1878	1 00	1,394,400	Mar.	1864	4 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pewabic, c.	Mich.	.....	500,000	50,000	25	185,000	Mar.	1868	3 00	460,000	July	1873	3 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phœnix, c.	Mich.	.....	1,000,000	20,000	50	817,500	Sept.	1870	3 00	20,000	Jan.	1876	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plumas	Cal.	.....	1,000,000	100,000	10	.....	.....	.....	.....	28,000	May	1878	10	...	4.00	3.90	4.05	3.95	3.95	3.90	3.95	3.85	4.00	3.85	4.00	3.85	6,700
Polar Star, g. s.	Col.	1,300	500,000	50,000	10	*	.....	.....	.....	5,000	Jan.	1878	0 10	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy, c.	Mich.	.....	200,000	20,000	10	.....	.....	.....	.....	2,130,000	Feb.	1877	4 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Raymond & Ely, g. s.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec.	1876	1 00	3,075,000	Sept.	1873	3 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ridge, c.	Mich.	.....	500,000	20,000	25	200,000	.....	.....	.....	90,000	Feb.	1875	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rye Patch	Nev.	3,000	.....	.....	.....	97,500	Nov.	1876	0 50	150,000	Dec.	1877	0 25	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Joseph, l.	Mo.	2,000 acs.	1,000,000	100,000	10	.....	.....	.....	.....	250,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savage, g. s.	Nev.	800	11,200,000	112,000	100	3,650,500	Jan.	1878	1 00	4,460,000	June	1869	3 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seaton, g. s.	Col.	1,700	500,000	50,000	10	*	.....	.....	.....	10,000	May	1877	0 10	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sierra Nevada, g. s.	Nev.	3,650	10,000,000	100,000	100	1,050,000	Jan.	1878	0 50	102,000	Jan.	1871	1 00	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver King	.....	.....	.....	.....	.....	.....	.....	.....	.....	200,000	Feb.	1878	0 50	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard	Cal.	.....	.....	.....	.....	.....	.....	.....	.....	300,000	Feb.	1878	1 00	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket, g. s.	Nev.	1,200	12,000,000	120,000	100	3,438,000	Mar.	1878	2 00	2,184,000	Aug.	1871	2 50	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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Non-Dividend Mines.

Allouez, c.	Mich.	.....	1,000,000	20,000	50	940,000	May	1876	5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alpha, g. s.	Nev.	300	3,000,000	3,000	100	213,000	Mar.	1878	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Flag, g.	Col.	5,300	600,000	60,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	12c	11c	.....	.....	12c	11c	12c	11c	11c	.....	11c	.....	2,400
Berths & Edith. g.	Vir.	645 acs.	3,500,000	350,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	15c	14c	16c	14c	15c	12c	13c	.....	13c	.....	14c	13c	28,100
Best & Belcher, g. s.	Nev.	545	10,080,000	100,800	100	337,792	Aug.	1877	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buckeye	Col.	.....	5,000,000	500,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39c	37c	.....	.....	39c	.....	3,500
Bullion, g. s.	Nev.	943½	10,000,000	100,000	100	2,802,000	Jan.	1878	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia, g. s.	Nev.	2,188	10,000,000	100,000	100	1,485,000	Feb.	1878	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cashier	Col.	.....	500,000	250,000	2	*	.....	.....	.....	.....	.....	.....	.....	.....	1.45	1.40	1.40	.....	.....	.....	.....	.....	.....	.....	1.40	1.30	1,400
Cleveland, g.	Col.	3,715	250,000	25,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Imperial, g. s.	Nev.	468	50,000,000	500,000	100	575,000	Oct.	1877	0 20	.....	.....	.....	.....	.....	.....	.....	1.40	.....	1.30	1.20	1.35	1.20	1.30	1.15	1.30	1.10	4,400
Con. N. Slope & E. C.T.	Col.	15,000	500,000	50,000	50	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dahlonega	Ga.	.....	250,000	250,000	1	*	.....	.....	.....	.....	.....	.....	.....	.....	18c	14c	18c	16c	18c	16c	20c	17c	19c	16c	17c	.....	52,300
Dana, c.	Mich.	.....	500,000	20,000	25	68,000	Jan.	1863	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dawson, s.	Ont.	.....	1,200,000	60,000	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duncan, s.	Ont.	.....	1,200,000	60,000	20	75,000	July	1876	41⅔	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Exchequer, g. s.	Nev.	400	10,000,000	100,000	100	380,000	Jan.	1878	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Placer, g.	Col.	.....	5,000,000	230,000	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.40	.....	1.30	1.20	1.35	1.20	1.30	1.15	1.30	1.10	4,400
Granville, g.	N. C.	9,000	1,000,000	100,000	10	*	.....	.....	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Humboldt, c.	Mich.	.....	500,000	20,000	25	100,000	Sept	1876	0 15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
International, s.	Ont.	.....	1,200,000	60,000	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Julia, g. s.	Nev.	3,000	11,000,000	110,000	100	525,000	Jan.	1878	0 75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Justice, g. s.	Nev.	2,100	10,530,000	105,300	100	2,237,500	Jan.	1878	2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
King's Mountain, g.	N. C.	.....	1,200,000	120,000	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.65	...	1.65	...	1.70	1.65	1.70	1.65	.....	.....	.....	.....	2,100
Lacrosse	Col.	3,900	1,000,000	100,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	45c	42c	45c	39c	41c	39c	42c	39c	43c	39c	42c	35c	59,600
Luzerne	Col.	4,200	5,000,000	500,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison, c.	Mich.	.....	500,000	20,000	25	123,000	Sept	1876	0 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mariposa preferred.	Cal.	44,387	5,000,000	50,000	100	1,425,000	June	1877	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	June	1877	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Memphis	Col.	6,000	300,000	60,000	5	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1¾	.....	1.45	...	1.35	.....	1.30	.....	300
Mesnard, c.	Mich.	.....	500,000	20,000	25	160,000	Apr.	1876	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, g. s.	Nev.	600	10,080,000	100,800	100	181,440	Aug.	1877	0 30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Overman, g. s.	Mich.	.....	1,000,000	40,000	25	3,053,880	Feb.	1878	3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Osceola, c.	Nev.	1,200	3,840,000	38,400	100	2,567,880	Nov.	1877	3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Petherick, c.	Mich.	.....	500,000	20,000	25	165,533	Mar.	1876	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasant View, g.	Col.	1,200	200,000	20,000	10	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quicksilver preferred.	Cal.	8,500	4,291,300	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	.....	.....	.....	.....	.....	.....	200
" common	Cal.	acres.	5,708,700	100,000	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16⅔	...	.....	.....	16¼	...	16¼	16¼	800
Rockland, c.	Mich	.....	500,000	20,000	25	495,000	Jan.	1874	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seg. Belcher, g. s.	Nev.	160	640,000	6,400	100	244,800	Apr.	1876	5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver City, g. s.	Nev.	3,900	6,310,000	63,100	100	15,775	Nov.	1875	0 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Hill, g. s.	Nev.	5,400	5,400,000	54,000	100	192,600	Dec.	1877	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Star, c.	Mich.	.....	500,000	20,000	25	265,000	Mar.	1876	0 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Superior, c.	Mich.	.....	500,000	20,000	25	340,000	Mar.	1874	0 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cons. g. s.	Nev.	850	10,000,000	100,000	100	285,000	Oct.	1877	0 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

g. Gold. s. Silver. l. Lead. c. Copper. * Non-Assessable.

Total Assessment levied to date..... 50,981,210 | Total Sales of Coal Stocks for the week..... 137,615 shares.
Total Mining Dividends to date..... 220,377,842 | Total Sales of Mining Shares for the week..... 164,211 "

+ A dividend of 3½ per cent. was declared on the preferred stock of this Co. in July.